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INFORMATION: PRESENTATION, POLITICS AND POWER

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Notes for contributors

Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, Kathleen Gray, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

The last thirty years as the seedbed of the future

Leslie Wilson

Director, Aslib

Paper presented at the 52nd Aslib Annual Conference, Edinburgh, 19th–22nd September 1978

Presentation, politics and power are essentially a matter of relationships involving, in our case, information and library organizations, Government, managements, commercial suppliers of information and users, among others. The interaction of these interest groups during the past thirty years—much of it in and through Aslib where they have a unique meeting point—has played a significant part in promoting the strength and vitality of our field of work. Aslib has not only the opportunity but the duty to continue to provide leadership on this scale into the future, not necessarily within the context of the United Kingdom alone.

Introduction

THE EYE OF RETROSPECT, or so I have been told, is often more myopic than we think. Nevertheless, I doubt whether I could be accused of grossly distorting the picture of Aslib thirty years ago if I said that the most exciting thing about it then had very little to do with conventional information. As I recall it, the most exciting thing was a time-lapse film—still something of a novelty—with which the late Sir Arthur Elton and Bernard Chibnall of the Shell Film Unit delighted Aslib conference audiences. From the front of a Southern Railway train, the film showed every yard of the fifty miles from Victoria Station to Brighton in five minutes flat. As the train halted abruptly at the Brighton buffers, the entire audience released its pent-up breath in an agony of mental and emotional exhaustion.

The memory of it flashed into my mind when the conference committee asked if I would make my valedictory to Aslib the keynote address to this conference and review the last thirty years of information transfer developments. Well thirty years of such fascinating growth and change in forty minutes would, I suspect, be as traumatic for both you and me as that breathless London to Brighton run. But fortunately, your conference committee has chosen for the theme of the conference the mercifully limiting title of 'Information: Presentation, Politics and Power', thus at least attempting to focus our attention on particular facets of our subject. Less comfortingly, perhaps, in view of the somewhat jaundiced eye with which all true Britons regard politicians, whether professional or amateur, the conference prospectus professes to discern a sort of protracted honeymoon between the theme and what is flatteringly described as my thirty years' reign. Be that as it may, I suppose it *is* true—if we regard the effective presentation of information, the political interplay of special interests

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and the exercise of power in the context of the information community as essentially a matter of relationships—I suppose it *is* true that the Director of Aslib does occupy a particular point of vantage from which to observe the game and to draw his own conclusions about it. Indeed, much of the interaction of the various groups involved—and they include government, specialist institutions and associations, industrial and business managements, the information industry and an immense variety of information users—takes place in and around Aslib, which provides a unique meeting point for such a diversity of interests. It is that capacity to accommodate so many diverse but inter-related interests that, in my view, has given Aslib much of its strength, and has enabled it to play a unique part in promoting the growth and vitality of our field of work. I must endeavour, therefore, to pick my way through the minefield that has been so tantalizingly sewn before me, and to set before *you* some of the impressions and conclusions about those relationships that seem to me important.

Relationship between information workers and management

Let me look first of all at the relationship between information officers and librarians and what we, rather loosely, identify as 'management'. I am, of course, speaking principally, though not exclusively, in the industrial and commercial context, and I give it pride of place for three reasons. First, because I believe that it is without question the area of our national life where the systematic exploitation of information assumes the most immediate and urgent importance, and because there are at long last some signs that our pre-occupations as a nation are changing from the equitable distribution of poverty to the purposeful creation of wealth. Second, because it is this relationship which is of the greatest personal concern to most of you. And, third, because I suspect that some of the things which I wish to say in this context are either reflected in, or have an important bearing on, aspects of other relationships to which I must refer later on.

The complaint has become almost traditional among librarians and information officers that management has no interest in information, indeed that it grudges the money it spends on its acquisition and internal distribution. I readily admit that it is difficult not to feel some sympathy with that point of view, particularly when one confronts the apparent insouciance with which some managements have truncated or disbanded their information and library units during the years of economic recession. Those are times, one can well argue—and I *have* frequently so argued—when the efficient information unit could make a major, and perhaps even a critical, contribution to company effectiveness. Nevertheless, we do all have a collective responsibility not only to consult our immediate professional interests but also to look *strategically,* if we can, at our various managements' objectives and the options open to them in their pursuit. In *strategic* terms the tendency has, I suspect, been all too often to ask the wrong question. Fundamentally, the point at issue is not whether company librarians have failed to receive adequate management support, but whether managements have failed to make propert and effective use of the information upon which attainment of their commercial objectives depends.

I am, of course, as well aware as you are yourselves that there could be almost as many answers to this question as there are managements. Nevertheless, the *generally* valid answer is, I fancy, not that managements are becoming any less conscious of their dependence upon information but that they are becoming more clear-cut and more demanding as to the information they believe will help towards realization of their commercial goals. And, in parallel, I think they are noticeably more reserved about formalized library services as the accepted mechanism for obtaining it. I have on numerous occasions quoted to professional audiences some of the descriptive titles which have appeared in public advertisements for information posts, and which seemed for all the world to be making a deliberate effort to avoid reference to formal information and library tasks and qualifications. 'An economic adviser to organize the flow of information', 'a company communications manager', 'a statistician to provide information systems in connection with manpower and strategic planning', and 'technical information engineer' are just a few remembered at random.

Such circumlocutions as these should not *necessarily* be dismissed as evidence that managers see only the technical context of their needs and are insulated by distance from the skills and mechanisms needed to fulfil them economically. The explanation to my mind is a more complex one and I dare say we do not fully understand it—perhaps we do not always wish to understand it! Traditional concepts of librarianship, the political pressures of other emergent specialist groups, the premium which modern industry necessarily places on various manifestations of numeracy no doubt play their part. But at the heart of the matter, I suspect, are the beliefs, all too often reinforced in practice, that librarians only produce documents, and that they neither think commercially nor have the benefit of training which has anything to do with the need to exercise commercial judgment in assessing the relevance of information to management decisions. What is so often forgotten is that the higher the level of decision-making, the lower is the need for published, paper-borne information and the greater is the need for 'intelligence', on the analogy of military intelligence, and intelligence culled from many types of sources, and analyzed, evaluated and interpreted against first-hand knowledge of company policies. Ironically, I think we have gone *backwards* in this respect. The information stalwarts of the 1950s took it for granted that they did not administer libraries but used them; also that they spent at least as much of their time information-and-idea-gathering orally and visually in the outside world as they did in digesting documents. The pressures—both economic and political—to blur the edges between librarianship and information science seem to me to have had a *restrictive* effect upon the professional information function within companies. The worst effect has been to point that function largely towards the manipulation of packages of documents through a variety of systems over which we argue and theorize *ad infinitem* whilst leaving the way open to economists, engineers, systems designers and a variety of other specialists to assume the more demanding and rewarding information functions which belong at the managerial rather than the executive end of the spectrum.

To be worth its salt, the information function really must make a creative contribution to company performance and that means a great deal more than just producing a string of facts or an army of documents. So it seems to me indisputable that an information function which is wholly library-oriented or document-oriented has as little chance of taking its place in the higher echelons of management, where I wish to see it, as I have of riding a winner in the Grand National. Nevertheless, I have no hesitation in declaring my conviction that the main thrust of Aslib's philosophical and political argument on your behalf should be aimed, as I have consistently tried to aim it, at that higher level of managerial involvement. If, as I believe, management consists of the effective deployment of a resource in pursuit of defined objectives, the information function properly belongs as a discrete element in the management structure—on a par, if you like, with investment management, personnel management and the rest. But the ability to place an advertisement in a newspaper does not make a personnel manager, any more than the ability to retrieve a reference from a magnetic tape makes an information manager.

The harsh possibilities of the situation were put with characteristic clarity by my old friend, Dr Lewis of ICI, at a joint conference[1] of Aslib and the Institute of Information Scientists in 1976 when he argued convincingly that by AD 2000 there would be no identifiable information profession, and that the information function would have been absorbed within the line function provided by each user group. No doubt like most of you, I would prefer to shun the message of that paper but you should certainly read it—and then determine to fight back! I think Sir James Cooke, then Chairman of the Secretary of State's Advisory Committee on Scientific and Technical Information, was making a somewhat similar point some years ago when he said that he looked forward to the day when only scientists would be engaged in scientific and technical information work. Combine those authoritative views with the tendencies indicated in the advertisements which I quoted earlier and the result, I can well imagine, must seem apocalyptic to those who pin their faith on the growth of an information profession through increasing sophistication of traditional librarianship.

If I say that such a reaction is one that I could understand but not share you must not deduce—as I am sure some of you will!—that my argument is against professionalism in librarianship or against current patterns of formalized training. What I *do* find disconcerting is the inward and restrictive thinking which such an attitude seems to betray towards a field of work which is essentially expansive, outward looking and rich in diversity. The call for 'nobody but scientists' is, for me, as far removed from reality as the call for 'nobody but qualified librarians' or 'nobody but information scientists', which could only in the long run consolidate our image *vis-à-vis* management as one of technicians with no role of creativity to play in relation to company policies. What is perhaps even worse, it would frighten off the many categories of specialists, such as those referred to in the advertisements, whom we ought to be persuading to regard themselves as an integral part of our information community. The fact is that the rich diversity of needs and opportunities inherent in the information transfer function calls for people from many professions and from none, and among them people who will transfer into and out of information work, and carry forward for application in other fields the knowledge, and above all, the ways of thinking that they will have acquired in tracking down, critically evaluating and interpreting such a wide range of information as most of us have to handle. I really do believe that the more blinkered our approach to this work, the greater the peril in which we place its future.

I hope that what I have just been saying will serve to explain the views that I have often expressed—for example, that Aslib's concern is not with a single profession but with a function; that that function must be essentially dynamic and idea-creative at all levels of management; and that managements, which after all are in the survival business first and foremost, simply have to take the broadest and most catholic view of information in which documents and libraries are but one vehicle among many. Aslib would itself be failing in its purpose, in my view, if it brought any lesser breadth of vision to its task, and it would certainly not have made the impact which it has already made on management thinking. But that impact needs to be sustained, and the more allies that Aslib can find in the industrial field to support its efforts the better.

Aslib and the CBI

In this context, let me commend to you as one potentially invaluable instrument on your behalf, the joint panel on information for industry which Aslib and the Confederation of British Industry set up a year ago. How far that panel can be instrumental in enhancing the relationship between top management and the information function remains to be seen, but its existence undoubtedly offers an unprecedented opportunity to combine the muscle of top management and the expertise of the information community in the pursuit of our common objectives. The importance of that combination is not difficult to see in terms of pressures upon legislators, and upon external suppliers of information to take account of industrial and commercial needs in the design of their information products and services. Indeed, even at this early stage of the panel's life it is possible to see the promise of useful developments in relation to such matters as EURONET, business information and foreign standard specifications. I hope, however, that the panel's purpose will not be seen only as exerting pressure outwards. A sustained inwards pressure will also be needed for many years to come—pressure upon senior managers aimed at creating attitudes within industry towards the broadening role of information, and at securing the establishment of rational information policies and a proper degree of investment in the exploitation of information by both individual companies and by industry at large.

To take just one example, I have never understood the sheer paucity of ideas for research coming out of industry and clamouring for attention—and that is in spite of Aslib's efforts to encourage individually or group-sponsored research as a means of helping industry to benefit directly from the research expertise built up at Aslib. Perhaps the CBI half of the panel could help to bring home to the senior management levels represented in the CBI the realities of the cost of information gathering and that might spark off a desire for greater understanding coupled with greater management support. Either way, political instruments like the panel are only as effective as the use that it made of them. Since its whole purpose is to work on your behalf, let me urge you to maximize its effectiveness by being constantly alert to the need for you yourselves to provide input to the panel's thinking and discussions by raising with Aslib or the CBI any problems of industrial information where you think high level management involvement might move more mountains than the information community alone.

Time permitting, I should have like at this point to turn to the relationships between the many associations, institutions and smaller groups concerned with the various stages and aspects of the information transfer process. I tend, by temperament, to like a tidy and logical scheme of things and I can imagine that the proliferation of interest groups great and small which is so characteristic of our field must have the quality of nightmare for those, for example, who have to plan for a national information system or those who have to introduce students to the field in which they will eventually work. On the other hand, information is a commodity unique in its facets and purposes, and in its relevance to, and pervasiveness of, the many strata of society. We should not be *surprised* therefore, at the great variety of interest groups which have their own limited objectives to pursue and which, I believe, can frequently achieve successes which larger groupings would not or could not contemplate. For my own part, I should be much more perturbed if those special interests were to be stifled and negated in some suffocating monolithic institution claiming the right to speak on behalf of all.

Aslib and the Library Association

Perhaps somebody will one day attempt to show how this variety of interest groups has assisted, or maybe has retarded, the development of our field of work. Today, my objective must be both more modest and more specific and I think some of you at least would, therefore, wish me to concentrate upon one particular relationship, that of Aslib with the Library Association and, in particular, upon the question of an amalgamation or some kind of federation of the two bodies. To put the matter in perspective, let me recall that the idea has been loudly promulgated by various interest groups, and just as vehemently rejected by others, for considerably longer than I have directed Aslib. And though some of you may have an inkling of my own views, I have purposefully refrained from expressing them publicly until there can no longer be any question of their being influenced by personal self-interest. Let me just record the basic facts that when I came to Aslib in 1950 the relationship was one of barely disguised hostility, whilst it is today one of mutual respect and even of operational collaboration where enlightened self-interest suggests it—as for example, in the current Prestel research project and (I hope!) in plans for an on-line information centre. In between I have taken part in joint syllabus discussions for the Library Association's examinations in the 1950s. I have used such influence as I had to secure the rejection at the Aslib AGM in 1957 of a proposal to set up a Register of Information Officers which was seen as a challenge to the Library Association's own near-monopoly of professional qualifications. (This I should explain was not based on a view of the Library Association's examinations but solely because I did not regard the award of professional qualifications as appropriate to Aslib's role.) I have also been a member of at least one top-level Joint Consultative Committee examining over a period of years ways of promoting co-operation between the two associations and have taken part in two detailed studies with the then secretary of the Library Association of the possibilities for either an amalgamation or a rationalization of activities. I have been involved in some three or four abortive attempts to produce joint statements of evidence on major policy issues. And I have had the benefit of continuous friendly contacts with three successive secretaries, and untold elected officers, of the Library Association, all of which have been professionally stimulating and personally enjoyable.

To me, the lesson of it all is crystal-clear and unequivocal. It is, quite simply: waste no more time worrying about mergers or federations. Whatever the emotional appeal may be, the facts simply do not support either proposition, and certainly not from Aslib's point of view. Where a coincidence of self-interest suggests that joint action of some kind may be profitable for both associations, that is a different matter, and the regular contacts that take place between the chief executives, senior staff and many elected officers can be relied upon to draw attention to such openings.

Now to look at the question in more detail. I think I have always had reservations about the legend of the 1930s and 1940s—repeated to me only a couple of months ago—which had it that 'if the Library Association had paid more attention to the needs of special libraries, Aslib need never have been founded at all'. It is a view which I suspect was an over-simplification, or possibly a later rationalization, of the situation. As I have said earlier, most of those who took the initiative towards the formation of Aslib in the 1920s were anything but librarians or even 'gatekeepers', to use the jargon of the 1960s. The membership of Aslib then was as lacking in homogeneity as it is today and many were, as they still are, less concerned with the intake and internal exploitation of information than with its outward projection and marketing to the world at large. By 1950 when I came into the picture, Aslib was already being encouraged by the Department of Scientific and Industrial Research, through which it received grants-in-aid from the government, to develop its activities further and to provide a much-needed focus for a whole range of interests concerned with the information spectrum of generation, distribution, collection, storage, retrieval and use. I doubt very much whether the Department's interest in Aslib would have continued for very long if Aslib had concerned itself only with the library element in that spectrum of collection, storage and retrieval.

I cannot emphasize too strongly the vital need for Aslib to adhere firmly to that broader view of its scope and objectives. It underlines two of the main considerations which were brought out time and again in the Aslib–Library Association discussions to which I have referred, and which are among the factors which persuade me that the two associations really do have insufficient common identity and common purpose to make a constitutional link a benefit rather than a hazard. Those two considerations are, first, membership and, second, objectives—the two factors that most dictate the nature of an association.

The Library Association, on the one hand, has a membership consisting of individual persons, all members of a single profession and all, for practical purposes, located in the United Kingdom. It is, in fact, a professional society with the duty to promote and protect the professional standards and interests of its members, and it would be failing in its duty to them if it did not do so.

As a research and development association, Aslib has no responsibility to promote or protect a single profession. Indeed, it would probably be in breach of the provisions of its Memorandum of Association if it did so. On the contrary, its task is to promote, on the basis of intellectual objectivity, a function in which *many* professions are involved—that is the function of information transfer or, as I prefer, the effective distribution, management and use of information'. That basis of intellectual objectivity has been shown many times to be one of Aslib's greatest strengths in its dealings with members, prospective members and other organizations, and it is doubly reinforced by its combination of financial and constitutional independence. Remove or weaken those bases and I believe you would disastrously undermine confidence in the integrity of Aslib's judgment and advice. In contrast again, Aslib's membership consists of organizations; and within those organizations, the individuals participating and responsible for sustaining membership of Aslib include librarians, information managers, editors, translators, systems designers, data-base producers, marketing managers, personnel managers, consultants and many others. Further, no less than one-third of Aslib's membership is located in eighty countries overseas, and one-third of that total is in the countries of the European Community. These seek a place in Aslib simply because they see in it the kind of focus that corresponds to their own appraisal of the information function. Many of them, and many of the non-librarian groups in the British membership of Aslib, have made it clear to me that they would see no place for themselves in an organization resulting from an amalgamation of our two associations and I have no doubt at all that such a step would be accompanied by a falling-away of much of the present membership of Aslib and its re-grouping into one or more new associations which would seem to them more relevant to their interests. In that, the object of the exercise would have been nullified and the cause of the effective use of information would have lost very much more than it could possibly gain.

So much for broad principle. Let me now look briefly at the evidence resulting from the efforts of the last decade or two. The principle argument adduced in support of amalgamation or federation is that it is desirable for a single voice to speak on matters of national policy, ostensibly to Government. The argument itself is, of course, debatable but it is qualified by two factors: first, major issues of national policy do not crop up every day of the week; and second, a single statement must be founded upon a very high degree of common interest if it is not to reflect the lowest common factor and say nothing.

If memory serves me right, there have been four matters in the last fifteen years which both associations considered as major matters of common concern: the prospective role of the British Library, evidence to the Whitford Committee on the law of copyright and designs; Public Lending Right and the proposal to incorporate OSTI into the British Library. Only on the latter was a common view possible to achieve, and that not on the main question of OSTI's future but to the effect that, wherever its future, it should retain its grant-awarding powers. In fact, the retention of those powers had not, I think, been in question!

Again, during 1967 and 1968 representatives of the two associations undertook a detailed study of the possibility of amalgamation and concluded that no basis for such a step existed. They then examined the scope for a rational division of functions. This also proved impossible to devise and, in April 1968, they concluded that it would be more practical to think in terms of co-operating in individual projects where this seemed advantageous to both parties. That, you might think, could well have ended the matter but a resumption of the broader discussions was prompted in September 1968, by the British Library, and a Joint Consultative Committee—which representatives of the Institute of Information Scientists and the Society of Archivists were later invited to join—was set up in December 1969. This committee met quarterly for four years and vainly attempted to identify matters for joint action. By early 1974 it had decided to reduce its meetings to two a year because of the limited common ground emerging from the discussions, and in March 1975, it was agreed that formal meetings should cease.

Since then the chief executives of the four bodies have met informally over lunch, three or four times a year to keep each other informed and to exchange ideas but, whilst these contacts are invariably enjoyable, it cannot be said that they have disproved the general conclusion of the Joint Consultative Committee. That all these investigations have been extremely costly in terms of the time of the senior people involved is not in question. But, as far as Aslib and the Library Association are concerned, it did demonstrate—and I believe clearly demonstrate—that they start from very different premises and have very different roles to play. Moreover, it demonstrated that their interests are not identical, and are frequently not even complementary. The important thing is that those roles should be respected, and that both should recognize that collaboration is unlikely to spring from a general precept but only from enlightened self-interest when a particular opportunity presents itself.

Specialist institutions and Aslib

Now, it is a short step from the Library Association to those other specialist associations and institutions—of which the Institution of Electrical Engineers and the Chemical Society are two outstanding examples—which, whilst primarily identified with some totally different subject area, have nevertheless developed a significant role in the information field. I was puzzled some two or three years ago when, in the course of a video-taped interview at Leeds Polytechnic, one of the interviewers asked me whether I did not see the emergent information activity of a whole range of specialist institutions as a threat to Aslib. I am still not quite sure of all the implications of that question but it did seem to indicate a less than perfect understanding of the information role of the institutions, and of the nature of the relationship between their objectives and those of Aslib. By and large, of course, they are members of Aslib and their role in the information field is anything *but* an emergent one. Their specialist publications and their abstracting and related services, not to mention their libraries, have from their early days played a central role in the information function relative to their respective disciplines. In that respect, they operate in relation to their specialist subject areas in exactly the same way that Aslib operates in relation to its special field of information transfer. 'Centres of excellence' is not a phrase that trips easily off the English tongue but this is in fact what the institutions are, and their information disseminating role is a logical aspect of their development as such. Where the most far-reaching changes are occurring, partly because of increasing understanding in the world at large of the role of information in modern society and partly because of the growing sophistication of the technology available for its dissemination, is in their welcome recognition that information is well on the way to being big business and, potentially, very big business indeed. I am convinced that large commercial interests are waiting in the wings for the psychological moment to move in with substantial investment, and far from being apprehensive about the role of the institutions I welcome the correspondingly commercial approach to their information functions which they are already demonstrating, and which smaller ones among them will undoubtedly have to emulate if they are to continue to play a significant information role.

Aslib Information Industry Group

What we are beginning to see emerging from the expansion of this role is an entirely new industry with enormous growth potential and one which, here and now, desperately needs to acquire an identity of its own. When it does so, its power within the information community must be immense. It was to assist in the formation of that identity that I asked the Council of Aslib in 1976 to agree to the creation within Aslib, of an Information Industry Group and, notwithstanding the slow start that such ventures often make, a speedy clarification of its objectives and operation is, in my view, vital to the long-term health of the information community. Already the group has attracted around 100 members, sufficient to demonstrate the recognition of a need for its existence, but Aslib's leadership in forming the Group must be matched by that of the leaders of the industry. In their own interests, I believe that they must be prepared to devote more time to a definition of those aims which they have in common, and, need I say it, more money to their pursuit. A narrow view of what properly constitutes the industry would, I am sure, severely limit its effectiveness. I would like to see brought into its purview not only the conventional and computer-based abstracting and indexing services but specialist primary publishers, commercial information and inquiry services (including financial and statistical services), systems consultants, systems operators and probably manufacturers of processing equipment as well. With that breadth of membership, the group should indeed be capable of exerting a worthwhile degree of influence on the development of our field.

Government involvement

If I have left any reference to Government until last it is clearly not because it is unimportant. On the contrary, increasing government involvement in so many other aspects of our national life has been paralleled by a growing acceptance of a role in furthering the systematic use of specialized information and, if we really believe that information is a resource to be deployed and used in pursuit of the economic and social objectives of the nation, it is difficult to see how governments could disregard it even if they wished. That role has developed slowly and somewhat uncertainly, but I think a trend has emerged over the past fifteen years or so of which it is now possible to take stock.

From 1944, when Government support for Aslib began, and for the next twenty years, Government interest in information was centred, I think one can say 'exclusively', in the Department of Scientific and Industrial Research (DSIR). The word 'information' was never uttered in isolation from the words 'scientific and technical'; dissemination meant largely dissemination of the results of scientific and industrial research; the application of science and technology to the pursuit of victory in war was pointing to the possibilities of repeating the formula as part of industrial and economic regeneration in peacetime; and by the early 1950s returning economic stability was encouraging industrialists to look beyond mere survival towards prudent investment in long-term expansion. For information activity in the context of industry, they were halcyon days. The influential industrialists on the DSIR's Industrial Grants Committee were genuinely anxious to help promote the application of information in industry; the emphasis was on the 'what and the why' of information work rather than on the 'how'; and, as a barometer of the times there was a rapid increase in the membership of Aslib from 1,000 to nearly 3,000 in fifteen years.

The dissolution of DSIR was brought about by the publication in 1963 of the report of a committee chaired by Sir Burke Trend called the 'Organization of Civil Science'. This, I suspect—with the benefit of hindsight—was something of a tragedy for industrial development generally from which Britain has not yet fully recovered. Its significance for us, of course, was that it removed the one Government support for any national activity in scientific and industrial information and those of us who feared that it signalled the end of government interest in information matters had perforce to make the case for the creation of a new unit which would maintain that interest. As you all know, the Office for Scientific and Technical Information was the result. Happily, its terms of reference included the provision of grant-aid to Aslib and we must be grateful to Dr Hookway that he made Aslib's research effort his first priority.

Less happily, Mr Harold Wilson was still some weeks away from feeling the white heat of the technological revolution. The Ministry of Technology was still to be born, and in the absence of a more appropriate Government department, OSTI became a part of the Department of Education and Science. I well recall the formation of the Ministry of Technology being announced not long after the proposals for the creation of OSTI within the DES has gone forward to the Secretary of State, and also a discussion which I had with the other member of the recommending committee who was mainly interested in industrial information. Regretfully, we concluded that to re-open the question of the location of OSTI at that late stage might well place the entire project at risk. Whether a switch to the Ministry of Technology could have been made is now of no practical interest, but I do trace to that accident of history the start of an increasing orientation in government thinking towards academic information and library interests to the detriment of industrial interests. I rather doubt whether there was anything particularly deliberate about this but the Secretary of State's Advisory Committee on Scientific and Technical Information was composed largely of distinguished academic scientists and it is scarcely surprising that academic concepts of information organization and use, which everybody knows differ greatly from those of industry, should have begun to exert the major influence. The later transfer of OSTI to the British Library and the emergence of the latter as the principal—or, for practical purposes, the only—government focus for forward thinking about national information needs, consolidated the trend and I think it is not unfair to say has helped to develop an information psychology which is in danger of congealing around libraries and library related systems.

The role of the British Library

I do not say that criticism on this score can be directed at the British Library alone, or perhaps even at all. I am only too well aware how difficult it is to elicit from industry and commerce a coherent and consistent view of its information needs and aspirations. I also know something of the efforts that the British Library has made, and is making, to understand where industry's problems lie. In an operational sense, it would be difficult to fault the service given by the Science Reference Library or the BLLD, but when it comes to strategic planning, I fancy that the BL from its very nature is under handicap in trying to encompass the whole range of industrial and commercial information needs. Where I suspect we are at fault is in expecting the British Library to combine effectively an operational library role (which it does admirably) with a national policy-making role over the whole range of library and information services. My misgivings in this regard—and they are of long standing—are only partly about an excessive concentration of power, and about concentration of power in what I feel instinctively to be the wrong place. To my mind, there is something wrong in principle if the rules of the game are written by the heaviest player: the separation of legislative and executive functions is always an excellent principle of government. My misgivings spring also from more practical considerations. For example, the Library Advisory Council, which the British Library administers, was certainly irrelevant to industry's concerns some years ago when I was a member and more recent comment suggests that that could still be true. Moreover, I cannot really see the great mass of British industry below, perhaps, the top 500 companies regarding library-oriented or reference-oriented policies as having any major relevance to them, and yet it is they who still present the familiar challenge: 'If the mass of British industry could only apply the knowledge available to the best, the nation's economic health would be transformed'.

Information for industry

If we are serious about instilling an information consciousness into more and more industrial managements we have to plan for making an impact in all the diverse ways that are possible and, for most of industry, this does not only mean paper or the video-screen. Especially, it means people, and people who have first-hand experience of industry's methods and problems, and can draw upon and interpret the wide range of resources available. The disbandment in the early 1970s of the Industrial Liaison Officer scheme started by DSIR in 1963, and then taken over by the Ministry of Technology, was arguably the biggest single act of folly in the industrial information scene since the war. If I had access to the very considerable funds required, I should be tempted to revive some such scheme and base it upon the Aslib Information Department whence it could derive the very varied support it demands. The ILO scheme's very real achievements in difficult circumstances illustrate once again the tremendously varied facets of the information transfer function and my concern is that, whether or not the British Library attempted to plan nationally for such varied requirements, its writ would be unlikely to run outside the formal library sphere, whilst to pin that wider responsibility upon it might well be interpreted as absolving other departments of government from acting at all. I really do find it difficult to understand why the Department of Industry, for example, maintains a low profile with regard to industry's information requirements. One would have thought that an Industrial Information Requirements Board was an essential tool in the Department's armoury, and that it would have insisted upon a major information component in the National Enterprise Board's machinery for the revitalization of industry. Then again, the Minister responsible for the Department of Energy is a vocal proponent of open Government and the free flow of information, but the Department does not appear to make any significant contribution to the development of national policies for information. I am, of course, aware of the recent recommendation of the House of Commons Expenditure Committee that the Department of Education and Science should set up a committee 'to examine the whole relationship between the Department, national, public, university and other libraries and library advisory councils', but the proposal appears to be wholly library-oriented and can presumably cover only libraries funded from the public purse. Perhaps the time is ripe for a parallel inquiry into national industrial information policies to be sponsored jointly by the Department of Industry, the Confederation of British Industry, and Aslib. Two have Chief Executives of comparatively recent date, the third will have one next month, and what are new brooms for, if not to sweep cleaner than the old! It is a thought which I can now leave with Dr Duncan Davies, Sir John Methven and Basil Saunders.

In conclusion

Well, Madam Chairman, we shall no doubt be treated in the course of this conference to many different interpretations of the theme 'Presentation, Politics and Power'. If I have chosen one based on the interplay of relationships between some of the principal interests involved in the information transfer function, it is not only because understanding of such relationships seems to me to be essential to the proper understanding of what our work is about, it is also because through Aslib they have provided me personally with some of the most fascinating subjects for philosophical speculation, and some of the most rewarding friendships for nigh on 30 years. In strictly factual terms, we have in our

Association an information organization unique in the world, and it is no mere sentiment to say that there is about it some peculiar quality of magic that holds most of those who work for it in thrall. That quality is worth all your efforts to preserve it in the modern world, and I can now only envy those of you who can still continue to play the role of the sorcerer's apprentice.

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Information as power

A. K. Kent

Director of Information Services,
The Chemical Society

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This is Leslie Wilson's last conference as Director of Aslib after 28 years in the post. As a newcomer on the information scene it is an undeserved honour that I should enjoy the privilege of coming in first wicket down in such an important match and following such an internationally recognized opening bat. It is, of course, possible that the order of batting has been chosen so that the loss of a couple of early wickets cheaply can be made good by the distinguished players to follow. Whatever it was that Leslie had in mind when he invited me to speak on the topic of 'Information as Power' I hope that I may do justice to the occasion and, if I do, that he will allow me to dedicate this paper to him as a mark not only of my respect for him, but also as a mark of the high regard in which he is held by all of us.

Introduction

WHETHER IT WILL turn out to be the case that we are on the threshold of the post-industrial society in which information and its management will supplant industry and agriculture as the major factors directing our social and economic evolution remains to be seen. It is at least certain that many commentators believe we are about to become an information society and the number of such believers is increasing. I do not yet count myself as one who espouses this view wholeheartedly, but this should not concern anyone too much since I suspect it arises from an unhealthy scepticism which is increasing with my age, rather than from any deep philosophical analysis. Nevertheless, I would go so far as to say we are on the verge of substantial changes in the way information can and will be manipulated and I cannot resist the temptation to play at futurology along with the rest of you.

For the purposes of the arguments that follow I propose to accept the scenario of the post-industrialists and to attempt to analyze some of the more or less ghastly things that could happen to us unless, or possible even if, we are alert to the dangers.

Is information power?

Information is the feedstock for knowledge. In an ideal world of unimpeded flow of information amongst individuals of equal capacity to process the information into knowledge there would be no advantage to be gained by any individual or group as compared with another by possession of information. But this is not the case. Information does not have an unrestricted flow; indeed there are many areas of human activity in which it is seen as necessary or imperative to impede the flow of information. Government, industry and

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commerce all quite deliberately obstruct the flow of information in order to gain advantage and from that advantage to acquire, maintain or strengthen power. This is seen as natural and proper behaviour, and so it may be.

Even if the flow of information were wholly unimpeded the capacity of individuals or groups to use it is unequal. This is at least partly because information is the feedstock of knowledge and not knowledge itself. As the feedstock it must be further processed, refined and recombined and those with the equipment to do these jobs well, will, in general enjoy an advantage over those who do not.

It seems to me, and perhaps it is self-evident, that it is not information itself that confers power. Rather it is the possibility of the control of the flow and processing of information that affords the opportunity to use information for power. Our interest should thus focus on the mechanisms by which information is generated, interpreted and presented rather than on the information itself. Viewed in this way information is no different from any other raw material or commodity and can be seen as being capable of being conserved, exploited, processed or used in manufacture as if it were coal or oil or iron ore. Before moving on to consider the mechanics of the future information society in a little more detail it is appropriate to ask whether the possession of the means for restricting the flow of information, or of the means for processing it in a way that is not enjoyed by all, has always conferred power on those with these advantages. It seems to me unnecessary to produce examples to show that it has. This leads one to suspect and, perhaps, fear that it always will be so. The power conferred by the unequal possession of raw materials and natural resources is clear. In the industrial society it is the factors conferring industrial power that have most impact on society at large; in the information society to come it will be the factors conferring information power that will be pre-eminent. These are not new, but will come to enjoy a new and greatly increased importance.

Information management in the future

What are the processes by which information is managed today and in what way are they likely to change in the future? I use the term 'manage' here with the whole range of meanings that can be found in any reasonable dictionary—handle, wield, conduct, control—and include the processes of creation, presentation and dissemination within the sense of the word.

Until very recently, and for a substantial period, the major mechanism for recording information has been by means of marks on paper. Though these records have been subjected to a variety of impediments to their free circulation —for example, by cost, or by law, or by considerations of industrial, commercial or political secrecy—the mechanism both for their creation and their use is essentially democratic in the sense that the vast majority of us are capable both of making the marks on the paper and of subsequently understanding their meaning with the minimum of intervention of technology. All we need is a pencil, paper and a pair of eyes. The invention of other methods for recording information such as the gramophone record, microfilm and the magnetic tape and its offspring, has interposed an increasingly complicated technology between the creator of information and the users of it. This trend is both continuing and accelerating and for two main reasons The first is that the cost of the mark on paper approach is seen as becoming too high and hence must be replaced by more 'cost-effective' methods. The second is that these new technologies are seen as providing, and indeed do provide, new opportunities for manipulating, distributing and accessing information—opportunities that do not exist with the traditional technology.

The new and future information management will come to rely more and more heavily on processes which further distance the creator of information from its users. Quite apart from any deliberate attempt by individuals or groups to gain information power by controlling the flow and processing of information, future information management will tend to create a group of information-advantaged individuals or institutions in much the same way and for similiar reasons as the industrial revolution has created industrially-advantaged individuals, institutions and nations. The tendency will be for this group to become both smaller and more strongly advantaged as information technology accelerates. This would be an unpleasant enough prospect alone. But, in addition, the new and future information management is creating and will continue to create opportunities for controlling the flow and processing of information whose implications for acquisition of information power are terrifying. Present public concern over the increasing volume of personal data recorded in computer processable form and capable of being collated, co-ordinated and analyzed in a way not previously possible is soundly based. There are real and imminent dangers in the capabilities that are being created.

Of course there are real and important advantages to be enjoyed as well. It is true that the traditional methods of information management are proving inadequate to their task. It is also true that the new information management will enable us to do things with information that we could not do before. It will be—already is—possible to process and interpret information and convert it to knowledge in ways and with a speed that has significantly extended the value of information as the feedstock for knowledge. This is good and healthy and it is important that in identifying the dangers and taking action to overcome them we do not fall into the trap of throwing out the baby with the bath water. I do not believe that anyone would deny that the mechanisms for collecting, storing, manipulating and disseminating information will change. This will happen whether or not the future is an information society. The pace of advance in information management may be more or less rapid over the next twenty years and will be governed to a large extent by the degree to which the projected information society becomes a reality. The direction of the advance is less likely to be affected by such factors; only positive action by those with a concern for the free movement of information can ensure that we do not create an information elite with all the dangers that such a situation implies.

What should be done?

I am very conscious of the risk of having the remarks I have already made, and those which follow, misunderstood. At the last Cranfield Conference I presented a paper entitled 'Dial-up and die—can information systems survive the on-line age'. I had intended that my remarks on that occasion would stimulate some constructive thinking about the proper balance between different mechanisms for providing access to secondary information. In the event it seems that many people thought that I was advocating the abandonment of on-line systems and a return to the conventional printed publication. Indeed, to my great alarm, I was congratulated by a number of participants at the conference for my firm stand against the evil forces of the computer!

May I, therefore, quite categorically assert that anything I have said or am about to say should not be interpreted as a plea for a return to the 'good old days'. If the development of new methods of handling information offers opportunities, as I believe, for the abuse of information power the solution does not lie in putting the clock back. I am not suggesting that what we have at present is better than what we will have in the future, but only that the new information management has a potential for abuse that is greater than the old and we would do well to be on our guard.

The key to ensuring that the exercise of power in the information society is democratic and benign and not totalitarian is the development of a practice of information management that makes information, and the mechanisms for processing it, as widely available as possible. There are a number of steps that can and should be taken.

The single most effective action that can be taken is to establish a profession of information management. It is necessary that all those individuals who are and will be responsible for the development and operation of information systems should do so within a framework of professional standards. At present there are a variety of efforts being made to improve and codify technical competence in the field of information management. Institutions like the Institute of Information Scientists and Aslib are playing an important role in this and I do not wish to appear to be decrying their efforts by asserting that there are aspects of professionalism that go substantially beyond mere technical competence that have not yet been considered.

A profession of information managers, I suggest, should concern itself with some of the matters which I have touched on in this paper. How far, for example, is it appropriate for the flow of information to be impeded for reasons of national, industrial or commercial interest? We shall be hearing later a paper from Mr Richard Buchanan on the topic of the Official Secrets Act and the concept of open government. Where I ask myself, is the professional input to that debate? Have we any views as professionals or do we, as I suspect, contribute only to the extent that any other more or less well-informed individual may do so?

In other sessions of this conference we shall be hearing presentations from the Commission of the European Communities and the British Library. These are institutions capable of exercising great influence over the direction in which information management will progress. What mechanisms exist at present for ensuring that their activities are subject to adequate professional scrutiny? And what are the guidelines, in any event, within which such professional scrutiny should be made?

The development of a profession of information management cannot occur overnight. While it is, in my view, an urgent necessity that we should take steps in that direction by evolution and growth of existing institutions, what can be done while the profession grows up? I would suggest that we should encourage and participate in a thorough and continuing examination of the proper balance between the old and new technologies for information processing. This examination will only be meaningful if it is carried out against a full understanding of the economic infrastructure of the present and future information societies. We know very little about the ways in which money and resources are deployed in the process of creation and use of information and understand even less how changes in investment or activity in one sector will impact on those of another sector. Until we have produced a realistic and informative model of the information society it will not be possible to assess whether a particular policy will add to, or subtract from, the overall effectiveness of information management. As a consequence we run the risk that the direction of change will be determined by those with the economic or political muscle to impose their will rather than by considerations of the general good.

Conclusion

I will conclude by way of a brief summary of what I think I have been trying to say. Information of itself does not confer power Unequal access to information and unequal capacities for processing and manipulating information do provide an environment within which it is possible for some groups to enjoy an information advantage over others. The new information technologies are likely to contribute to the strengthening of the undemocratic management of information and, especially in the context of an information society, to increase the advantage enjoyed by a smaller and smaller information-powerful elite. The likely political, economic and social environment of the immediate future suggests to me that the possibility that the power of information will be abused is real. It is not, however, inevitable. A more democratic outcome can be achieved through a better understanding of the processes of information management and by the application of this understanding within the framework of a professional approach to information management. The profession of information management must concern itself not only with technical or economic aspects but with political, social and ethical matters as they affect the free flow of information and contribute to an equality of opportunity to use that information in creating knowledge.

Information and communication

James D. Halloran

Director, Centre for Mass Communication Research,
University of Leicester

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Introduction

WHEN I WAS first invited to contribute to this conference I felt that, although I would be a stranger in your midst, I would not be approaching you or your interests from an entirely different planet. I thought that, in principle, we ought to have something in common. I still believe this—but I must admit that after looking over your programme for the week's activities I reached the conclusion that the differences between us, both with regard to central interests and our approaches to common problems, might be more evident than the similarities, and that they are probably more marked than I had first thought.

I was given a reasonably free hand as to what I might present to you under the general heading of Information and Communication but, as I am sure you will appreciate, this sort of freedom has disadvantages as well as advantages. In a sense we have a fear of freedom, and suffer under the burden of choice. Initially, proceeding like a true academic, I looked at the words and concepts so freely scattered throughout your literature—'communication', 'information', 'knowledge', 'learning', 'understanding', 'comprehension', 'transfer', and so on.

I am not quite sure why I started out in this way Perhaps I needed convincing that the lack of precision in the definition of terms and the general conceptual confusion was present in your field as well as in mine—(attitude, opinion, belief, value, value system, etc.)—and that, as information specialists, you shared some of the problems common to all social scientists. I was quickly convinced that, at least at this level—confusion and lack of clarity—we had much in common, and very soon equally convinced that to focus on problems of conceptualization in this talk (although no doubt the task is an important one and long overdue) would not be the most appropriate way to address you at the start of a conference, and certainly not the best way to attract your attention or maintain your interest.

I decided therefore to play safe, to stay in my own territory and select from it those topics, issues, problems, research findings, etc., which, after reading about your interests, I judged to be of some relevance. In the short time at my disposal I shall not attempt to apply these in detail to any of your specific problems. I shall leave the application to you, as you consider appropriate.

The first thing that struck me when looking at your programme and reading the summaries of the conference papers was what appeared to be an unquestioning, uncritical acceptance that information, variously defined, was vital—full

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stop. In view of the fact that in some way or other you are information specialists, perhaps I ought not to have been surprised at this. Nevertheless, I was tempted to ask *information may be the answer, but what is the question* ?

Who needs information?

Who needs information? What sort of information do they need? Why do they need it? Who decides that they need it? Who selects and provides it? What are the aims and intentions? What use is made of it? and What are the consequences of that use for individuals, groups, institutions and societies? These are just a few of the related questions that spring to mind. These are the sort of questions that I am interested in, as a sociologist working in the general field of mass communication. I study media and related institutions as social institutions, and I study communication as a social process. But I do not study these in isolation. Institutions and processes must be studied in the wider social context, in terms of their relationship to other institutions and processes, and to society as a whole.

As I see it, one of the main differences between us is that I do not take as given some of the things that you apparently do. In brief, I wish to ask questions about the factors that govern the production, dissemination, use and consequences of information. I think in terms of the functions of information or communication for all involved in the process, and I certainly do not take for granted the assumption of one of your paper givers, namely that information necessarily reduces uncertainty.

As far as I am concerned, in particular circumstances the provision of information may well lead to increased uncertainty. Moreover, we must not forget that ignorance can have its positive functions, that information could be a burden, that the possession of knowledge may be used as a substitute for action, and so on.

Communication of information

In many cases information is provided in the hope that some appropriate action may follow, but it is clear from the results of research across a wide range of topics that, at best, information may be a necessary, but is never a sufficient, precondition for the desired social action. I may be wrong, but these questions and problems do not seem central to your terms of reference. Your focus is information—as one might expect—but apparently in many cases this emphasis is to the exclusion of communication. There is little or no reference to the context and complexity of the communication process. Of course there is a notion of process implicit in your thinking and writing, and this seems to have been derived (unconsciously, no doubt) from a one-way, purposive, 'top-downwards' model of the communication process. It is a version of process which is essentially sender or provider oriented, and it looks at the whole matter from the point of view of the message giver—asking questions about getting the message across, effectiveness, etc.

This outdated model, which still has its adherents, implicit and explicit, in certain areas of education and psychology, is a totally inadequate one as we shall soon see. For example, a great deal of communication is not purposive, nor is it one-way, and effects are not the same thing as effectiveness. Some of the most interesting consequences of any given act of communication need never have been intended and, needless to say, what is intended is not always a clear guide to what actually takes place.

Over the past twenty years or so developments in the contributory streams of psychology and sociology have been fed into the study of the communication process so that today more sophisticated and refined models are available. But old habits die hard, and narrow one-way psychologically-oriented approaches are still with us.

Whether we wish to study the effects or effectiveness of any act of communication there are many factors that have to be taken into consideration, apart from the content of the message. We cannot expect to accurately predict consequences from content—no matter how thoroughly the content is analyzed—unless we know something about the source of the information or message giver, the nature of the audience or public and their perception of the source, the medium used, the communication situation, the nature of feedback (if there is any), and so on. All these variables are part of the communication process and must be taken into account.

Information may be provided, and it may be readily available, but provision and availability tell us little about use and consequences. Additionally—and I think it is particularly important to make this point at this conference—one of the factors that governs use, influence, consequences, etc., has to do with the nature of the source and how this is perceived; for example, perceived credibility is often very important. From our point of view it is essential not only to have information on this score, but to study all the factors (historical, economic, legal, technological, organizational, structural, professional, personal) which may impinge on the production process. Put crudely, communication has functions for both sender and receiver, and these are not independent of each other but are related in various ways within the overall social system.

Perhaps you will forgive me if I refer once more to what I feel is on your part a naïve believe in the power or value of information as such, coupled with a relatively crude approach to the problems of communication.

Let us look at a simple act of speech. Following the observation of an event or the provision of a piece of information, the information is selectively attended to, perceived, interpreted, 'translated', classified, categorized and arranged by the person who is going to speak, and at all these stages of the process personal, social and cultural factors intervene. In a way we are always talking about ourselves—we cannot escape our experience—our words represent a joint product of 'reality' and self. What information we provide in such circumstances is almost bound to be some way removed from what we observed, or what was provided in the first place Moreover, what the receiver makes of this following his selective perceptions, interpretations, etc., is another matter altogether. It is not surprising that exchanges, discourse and dialogue frequently lead to confusion and misunderstanding. You may have a naïve faith in the power and value of information—others may have an equally misplaced confidence in the constructive possibilities of discussion. What is needed, above all, is an understanding of the communication process so that all these difficulties may be understood and, hopefully, the obstacles overcome.

Some of you may argue that many of the communication problems to which I allude will be overcome by the technological developments which I know are central to your interests, and which others have spoken or will speak about. This may be so at some levels—but only at some. I would certainly be worried if, in the future, an over-optimistic approach to the perceived benefits of technology became coupled with the naïvety and the lack of knowledge about the communication process which I mentioned earlier. Communication is likely to entail selection, classification, arrangement, perception, etc., for a long time, and these processes do not operate in a social-cultural vacuum. We must be aware of the implications of this.

Conversion and utilization of information

It is important to note in this connection that the provision of information in symbolic form can only be meaningful to the recipient if that person has experiences corresponding to the symbol. In simple terms, the fields of experience, the world of discourse of sender and receiver must overlap before communication can take place. It is important to take this into account and note the degree of overlap in societies which are stratified, fragmented or differentiated, particularly when we realize that most communication systems are elitist, reflecting the power structure of the societies in which they operate and that, both nationally and internationally, the predominant flow of information and the direction of most communication is from the top downwards. We might note that so much communication is a matter of the few talking to the many, directly or indirectly, about the perceived needs or problems of the many, from the unquestioned standpoint of the few. Must it always be like this? Rather than go along with McLuhan's idea that the media is the message, we might more usefully attempt to find out (in different countries) to what degree is the medium the system.

It is worth mentioning in passing that there is also another lesson to be learned from this. This has to do with the inadequacy of studying information or communication systems or processes in isolation, apart from other institutions and processes in society. They can be adequately studied only in this wider context. This means, *inter alia*, that any changes or improvements we may have in mind are not likely to be brought about if we confine our attention and activities merely to a single source, medium or institution. The attack must be on a much broader front.

I referred earlier to the inadequacy of the models of the communication process which, occasionally explicitly but usually implicitly, seemed to guide much of the thinking in communication research. These inadequacies are particularly marked in approaches to the study of influence or effects, and although there is not time here for a detailed examination of this important question there are a few points that must be made.

Often, when attempts are made to study the impact or effectiveness of, say, a campaign to put across a certain message, the evaluation of the campaign is based on such things as verbal responses from the public to questionnaires or interview schedules (administered at varying times after transmission or exposure), which indicate that the message had registered, had been remembered, was capable of being recalled, had been understood, and so on. Incidentally, it should be noted here that claims about understanding or comprehension are often based on data which more accurately reflect retention and ability to articulate rather than understand. In some evaluations members of the public may also be asked if they have changed their attitudes and/or behaviour since receiving the message, or as a result of the campaign. But the answers to these questions are essentially self-reports. Rarely is substantiation required, and even more infrequently is actual social behaviour examined. Even if we accept the validity of the concept of attitude and are prepared to believe that attitude change may be accurately assessed by interview or questioning in this way, we still need to remember that attitude change is not the same thing as behavioural change, nor necessarily even an indication of it. This qualification applies, even more so, to the mere possession of information or knowledge and to the ability to remember and articulate.

As a result of these forms of evaluation, success has often been claimed for campaigns without any *valid* evidence to support the claims. On any given subject people may possess the necessary information, but many factors may intervene between information and the desired action. These might include physical, financial and geographical barriers, inappropriate attitudes (perhaps relating to past experience), conflicting attitudes (even when the appropriate attitude is present there may be others pushing in the opposite direction—attitudes do not exist in isolation), and lack of ability, facility or opportunity to translate the information into the appropriate social action.

We have examples from our recent research in health education, where people certainly had the necessary information, but where such factors as definition of sickness and health, expectations with regard to the medical profession, hospitals or clinics, and past experience in related areas (all of which varies according to social class), came between the possession of knowledge and the desired action. Other research on information and the welfare services indicates that some people who had the necessary basic information about benefits and allowances just did not know what to do about it, or how to use it. Additionally, we know of television programmes which have stimulated members of the audience to the threshold of 'pro social action', only for them to be left waiting on the threshold because of the weaknesses of the support system which was the responsibility of other institutions.

Let me repeat that information may be the necessary starting point, but it is rarely, if ever, a sufficient condition for action. Briefly, I suggest to you that you should pay as much attention to the conversion and utilization of information as to its provision. Yet, currently, provision seems to be your main, and in some cases even your sole, concern. What comes between knowledge and action should be one of your main concerns.

Media influence

I have referred several times to the paucity of our thinking about the communication process, to our conceptual inadequacies with regard to the process of influence and, more specifically, to the misplaced emphasis on attitude change.

There is much more to media influence than can possibly be covered by approaches which rely on attitude change, imitation, arousal or other conventional psychological approaches. It is the emphasis on these approaches which has impeded our understanding of the communication process and its several complexities.

We know from our own and from other work that the media may exert influence in many ways. For example, they may set the social-political agenda by, amongst other things, defining problems, amplifying them, and suggesting solutions. They may confer status and associate certain forms of behaviour with specific groups or individuals, and label both behaviour and groups as good or bad. They may legitimate certain practices, values, structures and systems and, in so doing, promote consensus and solidarity and reinforce the establishment or status quo. On the other hand, their influence may be disruptive, perhaps exacerbating conflict. But this, although dysfunctional from an establishment point of view, need not be so from the standpoint of those who seek change. As indicated earlier, the specific outcomes will depend not only on the media, or supply of information, but on a wide range of non media factors.

One of our main tasks as researchers is to examine, in different circumstances and with different issues, the interplay between media and non media experiences and attempt to assess the significance of this for social consciousness. But to do this along the lines I have just briefly indicated is no easy matter. It is much easier to stick to information testing and attempts to measure attitudes and opinions. Easier—but misleading; because these approaches rely more on available techniques, susceptibility to measurement, and false interpretations of 'scientific' which focus on methods, quantification and reliability rather than on validity. This sort of work, which has been criticized as 'concerned with doing rather than with thinking', is theoretically impoverished and conceptually crude. It needs to make way for a more sociologically oriented approach which attempts to study both 'sender' and 'receiver' in terms of their relationship to each other, to their own and other institutions, and within the framework of the appropriate social systems.

Is information understood?

Our research also shows—and I am very sorry that I have not more time to deal with this—that so much of the information that is provided is just not understood; and I say this fully conscious of the fact that our approach to the concept of understanding is not very sophisticated or systematic. Research seems to suggest that only a small proportion of news presentations (print and electronic) are understood or—if you prefer it—remembered, even by those who are regular readers and viewers.

The decoding of messages by the audience or public does not always coincide with the encoding by the media practitioner, and frequently this is due to the fact that the 'worlds' of encoder and decoder do not overlap to the required degree. The social class, cultural and associated linguistic differences here are obvious. But it may not be so obvious that, in addition to these differences, there are also important differences with regard to media professionalism which impinge on communication and understanding

In a manner of speaking, broadcasters and other media practitioners and providers of information do speak to and for themselves, according to internal professional criteria. In this way they create and perpetuate a form of professional tyranny. This means that all too often programmes, information campaigns, etc., are considered successful if they satisfy internally defined professional criteria, which may have no known relationship to effective communication. Obviously there is a self-fulfilling prophecy about much of this—the reinforcing message is repeated and the system is maintained and strengthened.

Decisions are being made every day about information and communication policies and practices. In this country we do not like to talk about communication policies—it smacks too much of central planning and the like—but none the less policy decisions are made by many agencies and policy exists, albeit fragmented and latent rather than overt and consciously articulated.

Policy making with regard to information and communication

When we examine policy-making in this sense with regard to information and communication we may find that the vast majority of decisions taken with regard to communication may be classified under three headings—namely, private profit, political expediency, and the need to maintain existing structures.

We would suggest that a fourth criteria should prevail, over and above these, and that it should be related to the information or communication needs of individuals or societies. Technology should not determine needs, but information and communication needs should be identified and evaluated (admittedly this can only be done from a value position), and then technological development and communication policy should be geared to meet those needs. One of the main tasks of research is to identify such needs and then to provide the information which is the *sine qua non* of intelligent policy formulation. This is no easy matter, but it represents an approach to information and communication problems which is much to be preferred to the approach which stems from an unholy mixture of technological and market determinism. It is certainly one that we must explore to the full!

DISCUSSION

Session 1

DR D. A. LEWIS (ICI Plastics Division) claimed that bearing in mind the effects of very rapid technological change and Professor Halloran's views on bias in the process of communication, the year by which there will not be an information profession will not be the year 2000—it will be 1990.

There was no reply.

PROFESSOR J. B. WILKINSON took up Professor Halloran's point about the professional arrogance of the television producers who used the language and format of their own circle rather than the language of sectors of the public. However one sector of television producers could be absolved from this, namely the producers of commercials. These producers aim their advertisements to the sector they wish to influence and are judged in their effectiveness by the sales response.

PROFESSOR HALLORAN replied that topics such as health education could not be sold like soap flakes.

MR T. N. RAJAN (Indian National Scientific Documentation Centre) asked Professor Halloran what kind of research in the sociology of information is required in developing countries where political set ups control the social structure.

PROFESSOR HALLORAN outlined a current research project in which India is collaborating. The project is designed to map out the existing communication behaviour, networks and patterns and then will attempt to make recommendations about a communication policy which will meet the established needs.

MR A. E. CAWKELL (ISI) quoted the example of the 64K RAM semi-conductor storage device which had received news headlines in the press but without any associated discussion as to its social consequences; he asked why the press apparently believed that speculation about the consequences would be of no interest to the readers.

PROFESSOR HALLORAN replied that only two of the national daily newspapers had science correspondents and that they were expected to report purely on scientific developments. Further, he explained that news is made by the newspapers, each story has a news value and that these values are accepted but not articulated. In order to maximize circulation, a development must have a sensational or conflictual element and presumably the 64K RAM had neither of these and so the national press did not recognize the development as 'news'. When compared to, say, the Russian newspapers' criteria as to what constitutes news, the 64K RAM development would probably be published in full because of the difference in the concept of what is news.

MR H. HANNAM (Foreign and Commonwealth Office) asked Dr Kent to elaborate his suggestion that a Hippocratic Oath is needed for information managers. Was it possible to draw up any basic principles on the social and ethical considerations governing the management of information which would have any validity nationally or internationally?

DR KENT replied that he thought it was possible but that he could not do it. If society is progressing towards an information society then the people involved in information must also be involved in the political, ethical and philosophical parts of their work which they have fought shy of so far.

The new technology

A. E. Cawkell

Vice President, Research, ISI.

Paper presented at the 52nd Aslib Annual Conference, Edinburgh, 19th–22nd September 1978

IT SEEMED LIKELY that Charles Clark's paper on copyright would not call for particular comment, as is suggested in the programme; in the event this is how it has turned out. The programme also indicates that I will say something about electronic journals—but that comes within the scope of P. W. Lea's paper, so I will not say much about that either. However at least three words on the programme *do* cover my comments—'The New Technology'. In this paper I will provide only a few headlines describing what seem to me to be matters of importance.

When I started to become more interested in information futures it seemed necessary to look out for, and try to understand, developments in several disciplines including electronics, politics, and sociology as shown in Table 1.

1. US information policy
2. Rest of world information policy
3. Fax; EFT; electronic mail
4. Social issues
5. Transmission systems
6. Economics of information
7. Copyright issues
8. Human-machine interface (not voice)
9. Teletext/viewdata/video
10. Microform systems
11. Human-machine voice communication
12. Electronics, processing, storage, micros
13. Information display
14. Cable television
15. Text processing, on-line journals, office systems
16. Security, privacy
17. Education systems

and classification and indexing (considered separately)

TABLE 1: *An idiosyncratic selection of information fields*

This is a disordered hotch-potch, but the action seems concentrated within these fields. In the last ten months I have accumulated about 1,500 items about these topics ranging from one page articles in the *Financial Times* like 'The Post Office—dilemma over system X' to long reports such as 'Symposium on trans-border data flows and protection of privacy'.

Since I work with a small staff and already operate a filing and indexing system for other topics, time has not been allocated for indexing these articles; this may

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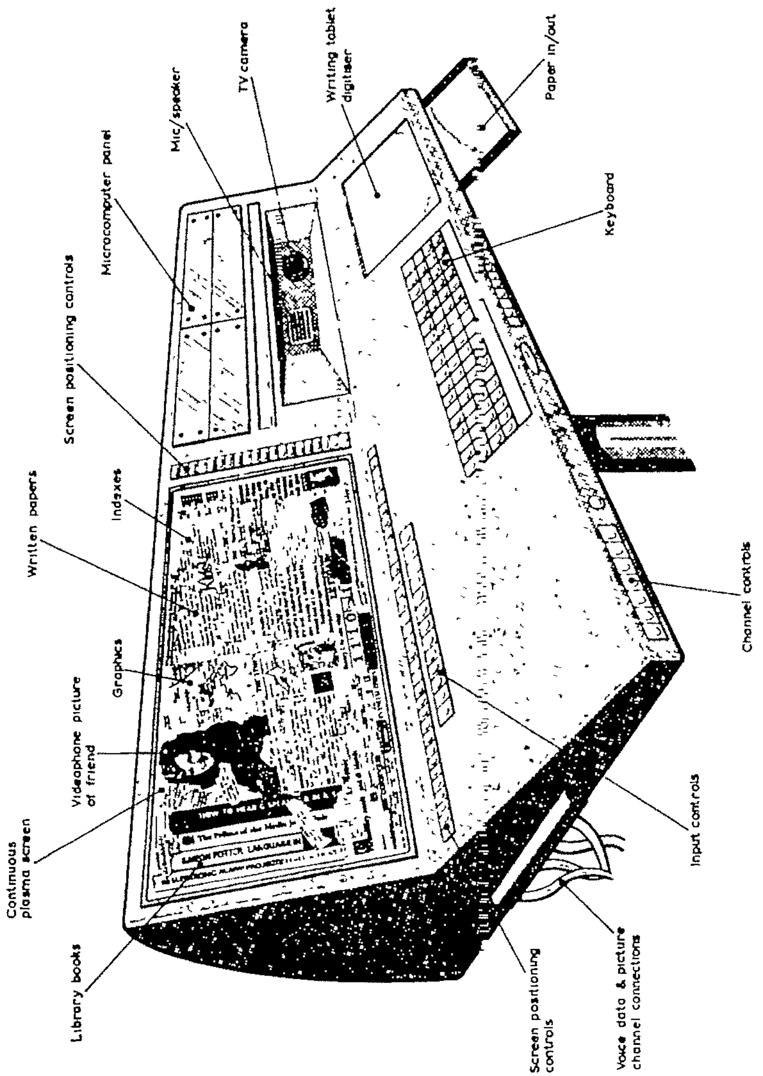

FIG. 1: '*Consumersole*'

become possible when a microcomputer personal information system called PRIMATE upon which we are currently working is on my desk. At the moment the 'information futures' papers are kept in a sectioned box by date order.

When first considering this subject I assumed that something like the device shown in Figure 1 might become feasible in terms of technology, communications, and cost in the year 2000, and that a few hundred thousand of these 'consumersoles' would by then be installed mainly in offices, but also in homes.

Upon what issues would this assumption mainly depend?

The list of topics shown in Table 1 compress down to the broad areas of interest in Table 2:

1. Human-machine information input
2. Human-machine information output
3. Availability and politics of communication channels and information systems
4. Occupational need for information
5. Social forces

TABLE 2: *Forces influencing information futures*

I will single out a few points of interest for brief discussion.

- Firstly, no suitable display exists whose information capacity matches the eye-brain's processing power. I am assuming here that usually people cannot precisely specify what information they want and so need to scan a certain volume of information in order to proceed from the general to the particular. I can go to an index of science (guess which one) of twenty-five volumes covering five years, containing about 2,000,000,000 characters, and open two volumes displaying four pages of 180,000 characters on my desk at one time. On the best available cathode ray tube I can call up 2,600 characters at a time for scanning. However to scan the ordered printed material containing seventy-two times more characters than the CRT it takes me only fractions of a second longer. I can change to another set of four printed pages almost as quickly as I can select a new CRT frame so in two successive scans I get an advantage in characters scanned of 144 times, and so on. Of course this is a gross simplification ignoring many other factors, but I have no doubt that ideally I need a screen 4 ft × 2 ft with the capability of juxtaposing, shrinking and expanding discrete areas containing many different kinds of information including pictures. At the moment I have doubts whether a suitable device will be available, at, say, £100 within the next twenty years.
- Secondly, continuing about particular points of interest, it seems to me that US openness and European secrecy will continue relatively much as at present, and also that US communications will tend to become non-monopolistic in some areas, whilst Europeans will continue with monopolies in all areas. The net effect will be a widening of the difference in the rate of information-flow in the US compared to Europe, perhaps to the extent that Europe will become relatively information poor. Remember that Tymeshare and Telenet pioneered and made possible rather cheap access to US databases in consequence of the Federal Communication Commission's relaxation of the communication monopoly. This happened because all of the issues had to be first openly discussed as

laid down in the US Constitution. Because this style is the norm, there are plenty of well-informed people ready and able to advance their viewpoint. How many people in the UK are permitted to, are able to, or are ready to exert any influence over the policy of the British Post Office, and what chance is there of changing the law to allow other organizations to do what the Post Office will not or can not do?

- Finally, and most important of all, come the social issues. There are so many that I shall mention only one. If we are moving into the age of information and of microprocessor controlled machines, new wealth will be required to be used for the benefit of the people for whom a job is no longer available. Ignoring the question of what form these benefits might take, the wealth can only take the form of value added to a commodity or service, or to the production of a new good. Is it possible to generate sufficient new wealth to provide the benefits? I doubt it, and I am not aware of any convincing advocate, either here or overseas, suggesting the source or amount of this wealth.

The situation will probably sort itself out by a series of confrontations and compromises, as has been happening since the industrial revolution, but the confrontations will be much more painful because the rate of change is likely to be too fast for our social and democratic processes, which are attuned to more leisurely rates.

Alternative methods of journal publishing

P. W. Lea

Department of Library and Information Studies,
Manchester Polytechnic

Paper presented at the 52nd Aslib Annual Conference, Edinburgh, 19th–22nd September 1978

WHEN A REVIEW is made of the main features of journal publishing in the 1970s it is suggested that four main developments will characterize this period. These are firstly, the so-called 'economic crisis' which publishers and librarians have experienced; secondly, the advent and rapid growth of on-line information retrieval; thirdly, the world-wide examination of the copyright problem and finally, the re-evaluation of alternative methods of journal publishing.

The information community, which includes authors, publishers, librarians and users, has experienced problems at various levels as a result of these developments, *but* from each has emerged, or is likely to emerge, a number of beneficial effects on the information transfer system.

The 'economic crisis', which saw the simultaneous rapid rise in the costs of journal publishing together with the imposition of economic restraints upon libraries, has caused a careful scrutiny of serial holdings to be made by librarians. Many academic libraries conducted user surveys and found that in some cases 30 per cent–40 per cent of titles were not used in any one year. One of the benefits of these studies has been that actual use made of the journals has become the main criterion for acquisition and retention, rather than demands to include fashionable titles by less than altruistic academics.

The benefits of the on-line services are already apparent in special, and to some extent, academic libraries. Public libraries, through such schemes as BIROS (Bibliographical information retrieval service; a joint project between Manchester Polytechnic, Department of Library and Information Studies and the Lancashire Library), will soon be providing public access to the on-line data bases. Perhaps we shall see a re-assessment of the role of the public librarian in the information structure as these services develop.

Copyright is currently being rationalized in many countries. We can only speculate as to what will happen here. Will single copying by reprographic methods be included in a blanket licence? Will there be a blanket licence? At present we do not know. But, it must be remembered that a blanket can smother a flame as well as fan it. The aims of the information community in the effective dissemination of knowledge must not be smothered in even more difficult legislation than currently exists.

Journal publishing

The fourth major development and the main part of my presentation is the

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re-evaluation of alternative methods of journal publishing. The term 're-evaluation' was chosen deliberately, since apart from the technological innovations, many of the apparently new ideas have been discussed in one form or another for the past fifty years at least.

Synoptic journals

Time will permit only a brief mention to be made of a few of these innovations. There have been many others of varying degrees of utility and practicality. Some, although expedient, have been socially unacceptable to authors who naturally desire the best form of presentation for their work. Others have been dropped, for example, because of their complicated financial management. One innovation which fulfils the function of providing an adequate showcase for the author, an attractive economic prospect for the publisher, as well as a manageable source of information to the user is the synoptic journal. These publications vary in format but essentially consist of a short summary paper complete in itself but backed by a full length paper. They are generally refereed so that quality control is maintained. There are four synoptic journals currently being published in the United Kingdom covering chemistry, mechanical engineering, production engineering and management research. They are cheaper to produce and purchase than the conventional journals containing full-length papers, so that there is every chance that we shall see a trend towards individual as opposed to institutional subscriptions.

As anticipated, there is no great demand for the full length back-up papers in whatever format and from whatever sources they are available. We are aware that the typical full-length research paper is consulted by very few individuals. Is now the time to ask whether the full-length paper is a luxury which we do not need and cannot afford except as an archival record on microform? The reaction of authors to synopsis publishing has been generally favourable and since its future will depend upon acceptance by this traditionally very conservative group, an increase in number of this form of publication can be anticipated.

Electronic journals

The second major development in alternative journal publishing has been mentioned in Mr Cawkell's paper. I share his belief that new technology will make a growing impact on the communication of information. The electronic journal already exists in one form or another. At present it tends to complement the existing conventional journals but for how long, I wonder, will we see the major secondary abstracting services continuing to be produced in their present format of print-on-paper with their enormous production and subscription costs?

The concepts of the electronic journal, 'paperless publication' and the Editorial Processing Centre have been discussed and evaluated at great length by Aslib[1] and the US National Science Foundation[2] during the past five years. The general conclusions have been that the technology exists and the systems could be workable although no overnight revolutionary change is anticipated.

Currently, examples of communication systems using computers are being tested at various locations. A very simple electronic journal has been developed at Manchester Polytechnic, Department of Library and Information Studies. *On-line Education News* (OLEN) is available on-line to possessors of teletype compatible terminals as a newsletter for lecturers at library schools concerned with teaching on-line systems. The newsletter is available daily and users can request the full contents of the main file or up-to-date details of news from individual library schools, or general news, from sub-files. A hard-copy version is reproduced at the end of each term directly from the stored text. At the moment input is made at Manchester but it is hoped that in the near future users will be able to input news directly.

Text processing

The other major area of technological development which has experienced rapid growth in the USA and Germany is the use of text-processing which is compatible with phototypesetting. The text processing system uses a typewriter to which a magnetic store is added. This allows text-editing to take place without re-keyboarding, giving obvious advantages of cost saving, faster production and removing the need for proof-reading. The stored information is either directly input to a phototypesetter or converted before the printing process takes place. The end product has the appearance of the conventional journal and can be as aesthetically pleasing. An in-house independent publishing system could be established using the equipment described. If the volume of input directly related to a publishing programme is high, it could be an economic proposition. However, an important consideration to take into account in the United Kingdom is the attitude of the printing unions to work from an unconventional source, although there are cases of such work being acceptable if it results in material being produced that otherwise would not have been printed.

Microforms

The third and final major area of development which is making a less spectacular, but in its own way, just as controversial an impact, is microforms. In the past we have normally associated microfilm with archival storage of newspapers and journals, and microfiche with the reproduction of individual documents such as US government research reports. Currently, microforms are being offered as alternatives to the printed paper in a number of ways. Some major publishers are making available simultaneous issues of microfilm and hard copy versions of their journals. Microform versions of full length papers are used as back-up papers for some synoptic journals and there exists the well-established supplementary publications scheme offered by the British Library Lending Division and other organizations. The advantages to the librarians and microform producers are well known but we still have a long way to go before the user is satisfied with them as an alternative. Whilst he is faced with indifferent quality microforms to be read on poor machines in a badly prepared reading environment the user can only regard microforms as an inconvenient imposition, and yet given a high quality product in the best conditions some of his frustrations may be at least alleviated. A use of microforms which may grow in the future is for on-demand publishing. The costs of reproducing limited use copies of documents from a master in this format can be quite low, particularly if the reproduction is made by an agency other than the original publisher, without having incurred the costs of producing the master. This is a further area where the copyright problem will need to be examined and clarified.

Conclusion

There are many other innovations which are being discussed, evaluated and implemented at the moment which time will not permit me to mention but it is important to remember that information about new methods, techniques, ideas, requirements and problems should be effectively disseminated to all members of the information community. At this point the work of the Primary Communication Research Centre at Leicester University must be mentioned as an organization which is attempting to monitor changes and innovations in publication and production of information sources in the *Scholarly Publications Guide New Methods and Techniques*[3]. Together with this type of service, I would stress the importance of regular exchanges of views and opinions at conferences and meetings, particularly internationally. When a typical journal is examined, it may be found to be published in Holland, printed in India, contain papers in three languages from authors in a dozen different countries, taken and read by librarians and users throughout the world, and yet we still talk of many of our problems and difficulties on a purely national scale. We must all take an active part in finding mutually satisfactory solutions to our information problems since we are all concerned with one ideal, that of effective dissemination of information, regardless of the package in which it comes.

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DISCUSSION

Session 2

DR C. T. S. KLIJS (University Library, Utrecht) asked whether the largest problem in copyright is not the registration and administration of photocopies made? He thought that most people would agree on the legal fundamentals of copyright as presented by Mr Clarke but that the administration cost for a simple photocopy would be relatively high.

MR CLARK replied that, firstly, he was pleased to hear that most people would not disagree with the principle of copyright. Secondly, he pointed out that although the Copyright Clearing Centre (CCC) in the USA had been in operation for less than a year, so far it seems to be running at a fairly nominal charge—*i.e.* it is charging at a rate of cents and passing on at a rate of dollars. This is partly because it is a non-profit-making area.

DR B. G. DUTTON (ICI Ltd. [Mond Division], Runcorn) asked about the copyright position *vis-à-vis* photocopying in libraries.

MR CLARKE replied that he could not really comment about libraries although he felt that the CCC regulations here seem a bit complicated and he hoped that they would be simplified in time. He also mentioned that severe administrative problems had arisen with the German copyright scheme where about 1 million Deutsch marks had been obtained in revenue but they had not found a means of distributing it.

MS E. MARCH (Rutherford Laboratory, Didcot) said that authors often have to pay in order to publish in learned journals. In other cases, authors have been paid to do their research on government money.

MR CLARKE agreed that this was a common situation and he had often discussed the problem with the publishers of learned journals. A similar situation had arisen with regard to the publications of the Open University—is copyright owned by the Open University or the individual author? If an author is paid as a professor and publishes material from his own lectures, maybe the copyright should belong to the institution instead of the author. This also applied to specialized translations done in the course of the translator's employment. Mr Clark said that he foresaw a big battle looming ahead on this.

MR CAWKELL wondered what authors value—money or prestige? If one asked authors what type of remuneration they wanted, some very interesting answers would emerge.

DR D. F. SHAW (Bodleian Library, Oxford) said that in his experience as an author of both books and papers in learned journals, the financial rewards paid by publishers nowhere near match the effort involved in producing the text. It is his belief that such authors publish for reasons other than financial reward and that, consequently, the value of the copyright in such cases is minimal. If, by chance, one produced a best seller then the situation would be quite different.

DR KENT added that the authors of scientific works on the whole prefer a once and for all payment for their property interest. Only if the work is a success do they sometimes wish that they had negotiated some other form of payment.

MR BINGLEY replied that he totally agreed, that if sales of a book took off, the author should benefit.

MR CLARK added that in Germany, authors even if they have assigned their copyright, have a moral right to an increase in their income if a book sells beyond expectations. This is not so in the United Kingdom.

MS C. R. VESEY (RTZ Services Ltd, London) asked who owned the copyright in a speech which was then published in, for example, the proceedings of a conference?

MR CLARK replied that it was by no means clear who owns the copyright in conference speeches. The speaker has a copyright in what he or she says but a separate copyright exists in the expression of what was said.

MR BINGLEY pointed out that the source of material is important. The copyright in unpublished material (*e.g.* letters) never dies—it descends to the umteenth generation. However the law by and large tends to stop at the point of practicality and so attendees at a conference do not share in the copyright of speeches.

MS S. KEENAN (Loughborough University) said that in his opening address Leslie Wilson had said some kind words about the problems of library school education. She asked if the panel could offer any advice as to how educators could themselves assess developing technology and pass on to students a basis for evaluating technological development in the information field.

MR CAWKELL answered that it was hard to find technologists with a social conscience but on the other hand not enough sociologists know enough about the technologies involved. The prime requirement was to collect evidence and not just be a prophet of doom. At the moment there was a lot of sheer speculation; we need a race of socio-technologists to provide the evidence on which governments could act.

MR LEA said that he was concerned about the lack of communication between groups in the communication industry. He had been to many conferences of editors, information scientists, publishers, etc., and many of them had looked at the problem only from their own viewpoint. Each group was planning systems in isolation—especially from the user. The problem for educators seems to be how to educate students about technologies in which one is not a specialist oneself.

MR C. D. WILL (Institute of Geological Studies, Edinburgh) pointed out that word processors and advanced phototypesetters have resulted in the production of camera-ready copy without the use of print unions and that these methods can produce in-house journals as a substitute for conventional publications.

MR LEA wondered if we will then get more and more in-house journals bypassing the traditional quality control processes. He was worried about what would happen to non-members of the group.

MR J. BETHELL (NATO, Saclantcen, Italy) suggested that scientific authors are happy if others photocopy their articles but are not happy if others photocopy their books, *i.e.* they have greater financial expectations from their books. He felt that this supports the 'best-seller' clause in the German copyright laws.

MR CAWKELL replied that the reprint business is still going very strong. In the developing countries especially it is very big business, because often they do not have the original journals.

MR BINGLEY asked whether the synoptic journal was a good idea?

MS E. MARSH (Rutherford Laboratory, Didcot) asked if the panel thought that the electronic journal would be delayed by the publishers.

MR BINGLEY replied that one could not stop technology.

MR CLARK agreed with this view and said that one still has to pay the cost of skilled copy editing whoever does it.

MR H. BAUM (World Meetings Information Center, Massachusetts, USA) commented that a publisher would be unlikely to oppose electronic journalism since hard-copy publication can often be accomplished by computer methods at lower cost than by conventional methods. As a result the changeover to electronic publishing becomes trivially simple and can be dictated by the sociological and economical aspects of the system.

MR BINGLEY wondered whether Mr Baum meant more economical or more profitable.

MS S. KEENAN (Loughborough University) reminded the audience that Price had predicted that the information output of the Third World would equal that of the developed world in quantity in six years and in quality in ten years. There would therefore be quite another dimension to this question soon. She felt that costing was the problem—that we had been doing our sums wrong in pricing mechanized information services.

MR LEA agreed that the output of the Third World needed to be watched. He said that we were too narrow in our outlook here.

MR CAWKELL said that there was no doubt about the eventual emergence of the electronic journal but the mechanics of the changeover would be tricky. At the moment there were about 40,000 journals which each had about 2,000 or 3,000 specialized readers. The electronic journal depends on access to telecommunications and terminals and he wondered what percentage of this specialized readership had access to these facilities or would pay for them. He felt that there would more likely be a gradual expansion in access to terminals until about 80 per cent of the potential readers are using terminals for some other purpose (*e.g.* Viewdata). Only then will the economics of the extra service be painless and only then will we get the large-scale breakthrough.

DR R. APPLEYARD (Commission of the European Communities, Luxembourg) said that he felt the concept of the electronic journal will be pushed regardless. Therefore the copyright problem must be solved partly to allow the orderly growth of the electronic side while still allowing the old journals to get some return.

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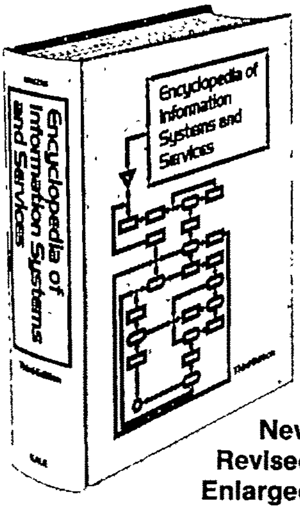

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52nd ASLIB ANNUAL CONFERENCE

INFORMATION: PRESENTATION, POLITICS AND POWER

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The politics of knowledge

Charles Clark

Managing Director, Hutchinson Publishing Group Limited

Paper presented at the 52nd Aslib Annual Conference, Edinburgh, 19th–22nd September 1978

Introduction

I AM A PRACTISING publisher and I approach the task this afternoon very much with that kind of bias. I am not an academic and I am not a real lawyer. I am a practising publisher with an interest in copyright. One of the most fascinating things that has happened over the last five to ten years is the way that interest in copyright, from being a rather arcane minor hobby of one or two people like myself in publishing, has suddenly become a central battlefield in the book world. What I want to do is to sketch in very broad terms some of the major battle sites.

We live with some very contentious issues. If we are to decide where we stand on some of these issues, then I think that we must listen to each other rather more often than we sometimes do, rather more attentively than we sometimes do, and exchange views and then make our minds up. I think, for example, the history of Public Lending Right (PLR) is an appalling example of people taking up set attitudes on many sides, digging trenches and firing across a kind of First World War waste land.

I have chosen five things to talk about very simply:

1. Access to information.
2. The question of joining the EEC and the very serious implications that has for the publishing industry, for authorship and beyond that for yourselves perhaps.
3. What I call the voice of the consumer and particularly the issue of resale prices maintenance.
4. The pressure of authors' rights which are going to affect us all considerably in the next five to ten years.
5. A slightly more relaxed glance at something which is not immediately relative to any of us at the moment but will be as it builds up—that is, the attitude of the Third World to traditional arts and culture, and the question of the status of folk-lore as regards copyright.

One thing that unites these five very different topics is, curiously, that they have little to do with pure copyright, but they all in their very different ways are

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likely to have quite significant and long-lasting effects upon the structure and content of copyright.

1. Access to information

Let me open with the one which I think is most familiar, and that is access to information. Let me talk also as briefly as I can about the dreadful monster called *reprographic reproduction.*

This subject contains in it a clash of principles; the principle of access to information is very largely your business. There is a world of information, of knowledge, of culture and it is your job to get that to a customer quickly and economically. That clashes with the principle of author's control over what he writes; and it does not matter here whether I am talking about W. H. Auden the poet, or about someone preparing a very technical paper for a magazine or even for a conference. Authors sit down at 9.30 a.m. with a cup of coffee and a blank bit of paper and a typewriter, and they start to type. There are rights inherent in that act of committing ideas and thoughts to paper, which in certain jurisdictions on the continent carry immediate implications for exploitation. In our country these are less immediate but nevertheless they are present and one of these rights is to control the reproduction of what you put on paper. What you put on paper is licensed through the copyright system to a person called a publisher and the publisher multiplies copies. That is all we publishers do—we pay the printer's bill and multiply copies. Other people, through various technological devices, multiply infinitely more that multiplication, and the question is, have the author and his licensee, the publisher (who has paid the printer's bill), any right to some return for the further infinite multiplication of what they have been licensed to publish?

If one looks at the history of this there is a paradox. The nineteenth century saw a tremendous growth in the protection of authors' rights. This was the era of the first Berne Convention, the first international instrument for protection of authors' rights and copyright. There are now something like seventy signatories to Berne, and fifty-five to fifty-seven signatories to its sister international copyright agreement, the Universal Copyright Convention (UCC) agreement, which was set up in 1955 after the Second World War.

Parallel with this growth of seeing that authors' rights are protected has been the growth of a technology whose whole purpose and justification seems to infringe those rights. That is the growth of reprographic devices of all kinds. The paradox is shown in the two quotes below:

(a) 'Multiplying copies for private distribution among a limited class of persons is just as illegal as if it were done for purposes of sale.' Take for example valuable copyright like Lord Tennyson's poems. No one can print them and distribute the copies among his friends or among the boys at a school any more than he can print them for sale. That's a judgement of 1884, Novello and Sudlow.

(b) Eighty years later, according to Marshall McLuhan at a 1966 PEN Conference, in the age of Xerox, 'the reader becomes a publisher and so does the schoolroom'. It is a very nice contrast, which points out the paradox with which I opened.

Does it matter? How big is the problem? Well, it's actually quite big. The latest figures which I have are for 1976. I take them from America because that, of course, is the largest English language culture, and in America in 1976 no less than 114,000,000 journal articles were copied. If we take the BLLD figure on how many of those were in copyright it is likely to be at least 30 per cent.

As regards books, some 2,000,000,000 pages were reproduced in the same year, in 1976, authorized under library supervision in America. These are staggeringly high figures. So in pressing this issue on your attention I am not talking about two pence. I am talking about an enormous international industry, if we take the English language alone. I will come back to this in connection with Europe because the European situation is somewhat affected by EEC attitudes.

For those of you who are interested in how other countries are tackling this clash of interests between access to information and authors' rights, there is a very useful survey by Paul Katzenberger[1] who is at the Max Planck Institute in Munich—a report on the attitudes in major European countries both inside and outside the EEC.

Even the Third World, which has most to gain from unrestricted, cheap access to information, at the IPA congress at Kyoto two years ago, committed itself to some form of return for originators and copyright owners from access to xerography. So, it is a large problem, it is an international problem, it is not going to go away!

Problems of copyright

If you are going to find a solution to this clash of interests, the first thing to do is to try to define what the interests are.

There are about five interests that need reconciling:

(i) the author, the originator of the copyright,
(ii) the publisher, the exclusive licensee of the right to multiply copies,
(iii) the mediator whose job it is to provide access to this material,
(iv) the user,
(v) the customer, the consumer who often is the user, but not necessarily so.

Unless you separate out these interests I do not think you are helping towards a reconciliation.

What are the bases of reconciliation? There are two strands now being explored. The first is what is called a *transactional* basis and the second is called a *licensing* basis. An example of a transactional basis is found in America, with the Copyright Clearance Center, the CCC. Now this is a very recent body—it has been in operation only since January 1978. The latest figures I have are at August 1978—200 publishers had registered approximately 1,630 periodicals with the CCC. At the same date, 567 libraries and other institutions had registered with the Center.

What does that mean? What is the effect of registering with the Center? You are a user, an industrial, public or specialist library. What it means is that the copying organization will report to the Center the amount of copying performed beyond that permitted by the new United States Copyright Act, and will pay to the Center the fees established by each publisher. So what is happening is that an increasing number of specialist journal publishers in America and in this country are putting on the reverse title page of their journal the actual amount that they will charge for photocopying They then register with CCC in America. Those libraries who have registered with CCC in America for any copying above that allowed by the new Act—which is quite a considerable amount, particularly in inter-library loan facilities—report to the CCC and they pay the money. The CCC takes a handling charge of about 25 cents and then passes the residue of income to the journal. Journals vary greatly as you know, from journals which pay fees to specialist authors to journals where there is a 'bun fight' to get articles in at all.

This is a very significant new development. And that is on what is called in the jargon a *transactional* basis and its importance is that there are an increasing number of American senior libraries, specialist and public, who are prepared to recognize that this conflict must be resolved and for fairly modest fees to pay above the limit specified by the Copyright Act. Clearly, the weakness of such a system is that you cannot police it. If a library will not register, then how on earth can you enforce payment? That is why other countries have gone for a licensing system.

Under a *licensing* system you license the act of copying as if it were a dangerous activity like driving a car. That is to say that you have to hold a licence to do this activity and you have to pay money for it. How much money do you pay? Well, that is probably the subject of regular negotiation between owners and users on a copy-page basis. To whom is the money ultimately paid? Well, that is probably worked out on a sampling basis. And it is this scheme which has attracted the attention of people in this country and people in Europe. In this country the first thought of the Wolfenden Committee which is looking at this issue, is that users should be offered alternatives of a transactional or licensing basis, probably geared towards a licensing basis for schools in the first place.

2. EEC and the UK publisher

The second issue is what I call economic bloc dogma and the UK publisher.

Now what has happened is this: until we joined the EEC nobody had had to deal with the question of the relationship between free movement of goods within the Common Market and the authors' and publishers' rights to do what they wished with their property, that is to say the copyright and the books multiplied through the copyright licensing system. If you set up an economic bloc like the Common Market then it is absolute dogma that there should be no partitioning of the Market—it is a *common* market, goods have to be allowed to move freely within member countries. The publisher's investment, however, is in acquiring an exclusive licence, an exclusive market for his edition. He cannot afford to pay the printer's bill, to invest in mailing costs, distribution costs and so forth if books can be supplied to his market from another source, because then his investment is at risk.

Let us take two specific examples from two very different parts of the book world. One is the mass paper back. Now paper back rights in an author like Frederick Forsyth are sold for colossal sums. If you have paid £100,000 to acquire an exclusive licence to publish Frederick Forsyth in paper back in this country, if you are putting a lot of money into window display and high discounts, then you cannot afford to have that right infringed. But meanwhile, the American publisher of Frederick Forsyth has exported let us say 50,000 copies to Holland for the European Continental market which is an open market, not an exclusive market. Now since we have joined the EEC the following uncomfortable question arises. Can the Dutchman, who bought 50,000 copies of the American edition, export those to the United Kingdom? We are now part of the Common Market and this free movement of goods is a matter of dogma inside the Common Market. Therefore, can he sell in Edinburgh a thousand, two thousand copies of this American edition, despite the fact that Corgi Books have the exclusive market in this country? The question mark at the end of that sentence is unresolved—this is a live, difficult issue.

However, let us take something more specialist. I mentioned Paul Katzenberger earlier—suppose Clive Bingley decided as Clive Bingley Limited, that the report from the Max Planck Institute was so important on the issue of reprographic reproduction that it should be published at a high price for the specialist library market. Suppose he has arranged with Dr Katzenberger to have this work translated into English. He shares costs of production, typesetting and translation with an American publisher. That is the only way in which he can get his economics right to publish this book in this country at a price which you are prepared to pay, as librarians. Now he cannot afford to publish this book in this country at the cost of mailing to all of you at whatever it is—7p a time these days—to find that the American edition has been imported into Holland and then re-exported into this country and that leading booksellers and big library suppliers are quietly selling this book throughout this country.

The end to that road is that there is an end to specialist translation work, because nobody can afford to invest in that way and then have investment eroded.

The problem centres on the scope of Article 36 of the Treaty of Rome and the proviso to Article 36. What the proviso says is, in effect, that although Article 36 is against the partitioning of the market—it prohibits the breaking up of the market by exclusive arrangements—nevertheless prohibitions are to be allowed in cases where the prohibitions do not constitute a disguised restriction on trade.

The cases in parallel fields, like trademarks, have failed. Gramophone manufacturers and others trying to get through the gate of the proviso have failed. Whether we can get the book trade through this proviso is at the moment not clear. The leading authority on this question is Alfred Dietz, who has done a major study of the reconciliation of copyright systems in Europe. He has paid particular attention to the problem created for English language publishers by Article 36, and some hope may lie in seeing the European 'cultural goods industry' as especially sensitive to activities outside Europe, and thus as immune to 'exhaustion of rights', the doctrine by which partitioning agreements are struck down.

Why has this only come up now? The answer is that the EEC contained, until Britain joined it, no other world language. For instance, if you are publishing in French there are no alternative centres outside Europe of major French publishing. In so far as Spain and Portugal do have major publishing centres of information and knowledge outside Europe—in Latin America and Brazil—the question may be aired again. But at the moment we are, quite frankly, battling as a rather lone minority on this issue.

3. The consumer revolution

Let me move to the third issue, which is the consumer revolution, and the whole attitude towards price competition. Now in a sense this is a bit of a red herring because there is no real copyright issue involved in retail price maintenance. In conversation, however, I find librarians always want to know what the latest state of politics is on retail price maintenance. Librarians have a particular interest in retail price maintenance through the Library Licence System. The 1962 judgement of the Restrictive Practices Court came to the view that Retail Price Maintenance through the Net Book Agreement, that is to say the netting of prices on books—the enforcement of the minimum price at which books are sold in shops—was not against the public interest. Particular attention was paid to the Library Licence System.

I will not read the whole judgment; but I will quote briefly from the 1962 judgment: 'Assuming the continuance of Retail Price Maintenance in respect of Net Books, the agreement is beneficial both to library authorities and to the ratepayers who finance them, since the agreement enables them to buy at less than the maintained public price'—that is a reference of course to the library 10 per cent discount system—'and to borrowers from public libraries because the money will buy more books for their use. If, however, Retail Price Maintenance in this field were to cease it might well be that some libraries could use their bargaining powers as buyers of very large numbers of books to obtain concessions in prices'. That was in 1962. In 1978 the arguments have not changed much. I will quote briefly from the evidence to the Commissioners in Brussels, of the current President of the Booksellers' Association who says: 'One important effect of abandoning the present agreement would be in relation to institutional business. There would be great pressure from libraries which already have a discount of up to 10 per cent for reduction in the price of books to them. A large number of stockholding bookshops who rely heavily on such business, up to the extent of 50 per cent of turnover, could not survive without it.'

Now the present position at the Office of Fair Trading (which watches the book trade very carefully since it lost the action in 1962—it has never forgiven us for that) is that the Office is at the moment taking its lead from Brussels. The attitude of the EEC Commissioners is that they are against Retail Price Maintenance for any kind of product. The fact that every single country within the EEC except France actually operates some form of Retail Price Maintenance in order to maintain large stockholding bookshops means, at the moment, little to Brussels and we have a very long and hard fight on our hands.

Now I think one could argue that the short-term interest of the library trade and librarians would be to say that without retail price maintenance they could bargain heavily as powerful buyers for cheaper and cheaper prices but the effect on the retail trade in this country could be catastrophic. My hope is that by an exchange of views on an occasion like this, when I can put that kind of point to you, we might in due course be able to encourage some support from the library world for Retail Price Maintenance, for the Net Book Agreement, and for the Library Licence, as it stands, in this country.

4. Authors' rights

The next issue is a fascinating one. In this country there is no such thing as authors' rights. You can deal with copyright as you deal with a house or a flat. You can sell it, you can lease it. You can do all sorts of things with it—give it away. But this is not true in other countries. It is especially not true in Europe. In so far as we are now part of the EEC we have to face up to the consequences of their very different approach. In many continental codes the author has inherent moral rights in his work, which he cannot bargain away because the copyright act of his country forbids him to bargain these rights away. As the language of need, so to speak, in this country becomes the language of right, so there are increasingly important voices saying we have got to set up moral rights in this country for authors as soon as possible.

What does moral rights mean? Or to use the jargon again, *droit moral*. Let me give you a very interesting example of how *droit moral* acts on the continent. It was given to me by a German lawyer.

There was, about ten years ago, a production of a Brecht play in Stuttgart—an ordinary production of a play. Somebody who had paid money to buy a ticket, an ordinary member of the public, went to see it. And he was so horrified, as an ordinary customer, at the production, because he thought that it betrayed Brecht, that he went to the court in Stuttgart, and said that this was so distorted a production that the author's moral right in the work was grievously harmed. Under the copyright act in Germany of 1965 it is an offence to present an author's work in such a way that it distorts or mutilates his work. The court ordered the production to be taken off. It is quite a staggering idea, in this country.

However, there are many other less extreme examples of *droit moral* and I thought you might be particularly interested in Article 42 of the German Copyright Act. Article 42 says: 'an author may revoke a licence if the work no longer reflects his views and he can, therefore, no longer be expected to agree with the exploitation of the work'.

Let us say that Professor Friedman has some change of heart on the road to Damascus and changes his views about monetary policy and says: 'I just don't believe it any longer. I'm writing a new book about it. I revoke my licence.' Now, he has to compensate his publisher—that is clear under the German Act. However, all you librarians are Xeroxing Milton Friedman at a colossal pace, all over the country, but the publisher's licence has been revoked. By implication, all copying is revoked! If someone like Milton Friedman pursues this we will all find ourselves with small injunctions dropping through the front door. It is a fascinating view of the rights of authorship. There is no way in this country at the moment that could happen, because the licence for this purpose is irrevocable, but I offer it as an example. There are many others I could speak about in the German Act but the one most likely to interest you is this right under the copyright act to say 'I no longer think that way. I am withdrawing this view. I am withdrawing the licence to promulgate that view.' And the whole copying industry would have to halt. It is a very interesting example of the extent of *droit moral*. And *droit moral* will not go away.

Duration of copyright is something else which comes under authors' rights Now you know that the author's copyright lasts for life plus fifty years in this country. In some continental countries it lasts for life plus seventy years. The EEC are intent on reconciliation of this issue and what they have come up with is reconciliation in the form of seventy years which consists of fifty years duration of copyright and twenty years of what they call *domaine public payant*. What this means is that works go into the public domain but there is a taxing effect on those works. For example, Hardy died in 1928 I think, fifty years ago, which brings us to 1978. Therefore Hardy goes out of copyright at the end of this year and under *domaine public payant* there would be a twenty-year period in which the publishers, that is, whoever published Hardy from January 1979 onwards, would have to pay a small royalty to a body for the privilege of publishing Hardy. Now the income from something like this, for example Shakespeare, could be colossal. On the one hand publishers dislike this intensely because they say it will put up the price of books, on the other hand the amount of money which could be released for all of us in the book and information business, to do some very good research and necessary work on the future of our business could be enormous. Although the Whitford Committee came down against *domaine public payant* it will not go away because the Commissioners are pushing it.

It will not please you but I have to tell you that the Commissioners are also intent on establishing public lending rights throughout EEC countries. In five EEC countries they are pushing arguments for *all* kinds of libraries, *i.e.* non-public libraries, specialist, profit making, public libraries and so forth, so it covers yourselves, as far as the EEC is concerned. You will have seen that Maureen Duffy here managed to get the endorsement of the TUC strongly in favour of PLR, so I think an Act is likely to go through in the next couple of years because both Tory and Labour are committed to PLR.

5. Folk-lore and copyright

Now the last issue that I said I would talk about seems very remote in a way; but it is part of the backcloth of publishing and copyright and one always has to see what is happening in other fields besides one's own. The most interesting recent development has been attempts by developing countries and by countries with a strong minority culture to find some copyright solution to preserving folk-lore. I am going to draw very heavily in these last pages on a paper by Peter Banki who is a legal research officer in the Australian Copyright Council in Sydney. He has been particularly interested in this issue because of the Aboriginal culture in Australia. What they are concerned with is the role of copyright as a support, both to prevent gross exploitation of folk-lore and in preserving folk-lore as part of the cultural identity of a people. Now so far as copyright enables an author to control what happens to his work—I stress both author and work—the attempt is understandable. In so far as folk-lore usually has no identifiable author and itself as a work is very hard to define and identify, the attempt may be misconceived. The standard English response to this is to say that it is nothing to do with copyright and 'we don't like it and will it kindly go away'. Well, it will not go away because the joint Berne-UNESCO copyright panel has in fact done a draft model copyright law for developing countries which was adopted last year in Tunis and it includes provisions for the protection of folk-lore.

You might be interested in Peter Banki's account of the Australian experience with Aboriginal culture which is, of course, still alive. 'What should be the position,' he asks 'if an Aboriginal tribal group seeks to prevent the use of a sacred traditional theme by uninitiated persons? Should they have a right to control any such use or only commercial uses? Does folk-lore protection mean the prevention of undesirable uses of sacred works? Are we concerned with moral right or economic right?'

He illustrates the point from his experience with one Aboriginal artist called Malangi who is alive today and working in North Australia. He does bark painting. One of his bark paintings on certain mortuary rites, a matter of a traditional sacred culture, was reproduced without his permission on tea-towels. They were manufactured in Poland of all places in large quantities on the order of an Australian importing and wholesaling firm and the towels were being distributed to retail outlets throughout Australia. The original of Malangi's painting hangs in a gallery in South Australia but a photograph of it appeared in a text book in a library specializing in the collection of books of Aboriginal bark paintings. It was apparent that the reproduction for the tea-towel was made from a photograph in this book. Now Banki sketches two possible solutions to the kind of issue which is raised here. The first is a moral protection for living practitioners of tribal art and he suggests an exclusive right of expression recognized for as long as the works retain a ritual significance. This would vest control over their work in, for example, tribal painters who restore cave painting and in performers of traditional music and dance where the performance could be fixed so that copyright could be vested in it. That is a moral protection.

Alongside that he points to schemes already mooted or in existence for an economic return for exploitation of folk-lore. The first is a kind of collecting agency for Aboriginal artists and he says a new company has been formed to act as a collecting agency. The company will obtain the artists' licence to negotiate with potential users for the use of their work. It will issue commissions, collect royalty payments and remit to the artist concerned. This happens to fit in with some of the traditional tribal attitudes of Aboriginal artists towards their work and that collecting agency has been set up on a private basis.

More interesting and coming a little closer to home, the state intervenes. In certain developing countries the state has intervened to protect what is called 'the national cultural heritage' through registration of folk-lore works and the collection for use of such registered works of a royalty fee by the state, some of which is then passed to the artists where identifiable. Let me illustrate this from Latin America. The developing countries there have taken this point very strongly, and pushed it at international conferences. Article 11 of the Chilean Copyright Statute of 1970 defines 'national cultural heritage' as 'cultural public domain'—we are back again to the *domaine public payant*—as 'works when a period of protection has expired, works of unknown authorship including songs, legends, dances and expressions of accumulated folk-lore'.

Now from acquiring in this way a vast exclusive cultural empire to charging admission fees for it, is a pretty short step. This happened, for example, in Mexico where a levy of 2 per cent is paid to the state for exploitation of such works.

Let me bring the argument finally to this country. In the quotation I am now going to use on this theme, where I am actually dealing with a 1968 decree in Bolivia, you should substitute in your heads, as I talk, the word 'Scotland'. Look at the supreme decree of 1968: 'works of music produced by country and folk groups and being of unknown authorship or by authors dead more than thirty years (that's Robbie Burns for sure) are declared to be the property of the State. Users of such works called 'recollectors' (a very interesting phrase, particularly in terms of the performance of folk music) must register their works and compositions and all income derived from these is paid directly to the Ministry of Culture and Tourism. The Ministry subsequently remits 40 percent of the money to the registered Recollector'.

Now it is not altogether fanciful to wonder whether if the Scots had conceived the idea of protecting their folk-lore in the past they could now have a real oil rush on their hands. If you go back even fifty years—and that is not a long time in copyright—the income from the exploitation of rights, in the patterns, colours and weaves of tartan alone would finance Scottish independence!

The last example is not, of course, a copyright under attack. It is copyright as a protective umbrella—it is an extension not an erosion of copyright.

Conclusion

I posed the question 'Can and should copyright survive?'. I offer two answers. The first is the practical response. If you look at the programme for this conference alone it demonstrates that information, knowledge, dissemination of culture is now a huge, complex, technical and international business. As it gets more complex—just think of the possibilities of Viewdata in this respect—it becomes ever more important to know just with what and with whom you are dealing in any transaction. I can think of no other framework than copyright that offers so basically simple a model of coping with that complexity. It combines great flexibility with great precision. It can absorb, as I have tried to demonstrate, both economic and moral criteria and it can respond to new technology. The arguments usually at the cutting edge of copyright and the information business, *e.g.* on computer information and its relationship to copyright, are not really about copyrightability but between competing interests concerned with exploitation *within* the framework of copyright.

The second answer is a moral response. I feel very strongly on this issue. It is one mark, and a very important mark, of the civilized community that it honours its creators and respects their rights and their work. I have demonstrated, I hope, in one or two instances this afternoon that in this country we lag rather shamefully behind our European colleagues in not recognizing the status of authorship and of creativity. I hope it does not seem rude just to point out, however softly, to all of us this afternoon that I should think a very high proportion of us are paid a monthly salary with pension rights, with paid holidays, and that without authors of all kinds we would not have that privilege. We actually owe to authors our living. In all the politics of knowledge we should not, I think, forget that.

Let me end with a quotation—one of the more splendidly robust quotations from the traditions of English Common Law. 'It is wise in any state to encourage letters and the painful researches of learned men. The easiest and most equal way of doing it is by securing to them the property of their own work. A writer's fame will not be the less that he had bread without being under the necessity of prostituting his pen to flattery, to get it. He who engages in laborious work (such for instance as Johnson's Dictionary) which may employ his whole life, will do it with more spirit if besides his own glory he thinks it may be a provision for his family.' That was Mr Justice Wills in a case, Miller vs. Taylor, in 1769.

REFERENCE

1 KATZENBERGER, PAUL. *Copyright and reprography.* STM and IPA. Amsterdam, 1978.

Government attitudes to information

Richard Buchanan, MP

House of Commons

Paper presented at the 52nd Aslib Annual Conference, Edinburgh, 19th–22nd September 1978

Introduction

BRITAIN EXCEPT IN time of war has never had a Minister of Information. Each Minister is responsible not only for the policy of his Department but also for the publicity of that policy. During my thirty years in Local Authority and Parliament, I can honestly say that I have never been conscious of any Minister or Official withholding information from me. That may be because my specialties were not prominent in the field of controversy and—significantly—the furore arising from the publication of the Government White Paper CMD 7285, *Reform of Section 2 of the Official Secrets Act*, was generated by somewhat biased neutrals with an interest in controversial fields. I propose to return to the question of the White Paper toward the end of this paper.

There is no doubt that there is a considerable volume of government information on government information, more than enough to satisfy the requirements of a considerable percentage of the population above and below Mr and Mrs Average Citizen. I fell to comparing the task of the Government in supplying information with that of the librarians who have to satisfy a great number of inquiries from varied sources. The Public Reference Library has to cater for six main categories of users, as does the Government.

Users of Government information

1. The specialist who possesses considerable knowledge of his subject and also of its literature—a familiar figure to the Reference Librarian and to all Government Departments, *e.g.* MPs specializing, universities, local authorities, pressure groups, industrialists, T Vs.
2. The educated non-specialist, intelligent, well-informed, familiar with sources of information, *e.g.* MPs not specializing in a particular field (and MPs can only usefully specialize in two, maybe three Departments), T Vs and industrialists outwith their particular industry.
3. The person with a good knowledge of his subject, wishing to know more, but unfamiliar with its literature, *e.g.* promoted people, persons coping with new Bills, Statutory Instruments, etc.
4. The reader possessed of little or no knowledge of his subject, unable to use a catalogue or with little or no training in use of literature and who requires considerable assistance from the staff, *e.g.* in Government terms, Social Security, etc.

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5. The telephone inquirer and the reader who makes his request via the Royal Mail. All Government Departments have a huge stake in this field. The *House of Commons and the House of Lords Weekly Information Bulletin* stimulates inquiries. There are special telephone numbers, 01-219 4272 for the House of Commons and 01-219 3107, House of Lords which citizens may ring in order to have their queries answered.
6. In addition to this, the House of Commons Library Indexes are being put on computer. (Here may I pay a tribute to the report made on computer services by a team from Aslib which has been an invaluable reference.[1]) We hope to make this available to users outwith the Parliamentary sphere.

As it is the duty of the Public Reference Library to try to cater adequately for all types of reader, so it is the duty of the Government to ensure that information relating to Government Departments is also adequate enough to satisfy the ever-continuing and endless variety of requests made by citizens, individually or collectively.

Some very high-powered committees have conducted inquiries into the various aspects of the Government Information Services.

Inquiries into Government information Services

1968 saw the Fulton Committee (CMD 3638). Among the subjects it covered were consultation and secrecy and it said on page 91, paragraph 1: 'We welcome the trend in recent years toward wider and more open consultation before decisions are taken: and we welcome, too, *the increasing provision of detailed information on which decisions are made*. Both should be carried much further. It is healthy for a democracy increasingly to press to be consulted and informed.'

The Committee suggested an enquiry to make recommendations for getting rid of unnecessary secrecy and the Government decided to carry out this as an internal Civil Service enquiry. This resulted in the 1969 White Paper (CMD 4089), 'Information and the Public Interest'. This paper consisted very largely of a list of new and expanded publications and was described by Mr R. Wraigh, *Open Government—the British Interpretation* (Royal Institute of Public Administration) as a somewhat self-congratulatory document.

In 1973 came the *Kilbrandon Report of the Constitution* CMD 5460, which stated, paragraph 320(2), 'The whole question of secrecy is bound up with the delicate problems of diplomacy and practical administration which cannot simply be ignored in the interests of more open Government.'

[The Minority Report took a less complacent view, saying that, 'It is not in the nature of governments and their bureaucracies to provide the people with more information than institutional and other pressures can prise out of them' CMD 5460-1, paragraph 80(3). One of the signatories of the Minority Report, Lord Crowther Hunt, was a member of the Fulton Committee.]

A Research Paper (No. 6) presented to the Kilbrandon Commission (*Information and the Public Interest*—M. J. Butler) took the view that, 'Whilst not advocating the complete opening of the policy-making process, the need to provide for greater participation in it is not met by the present system of issuing Green Papers' (page 15(4)).

On 24th November 1976, the Prime Minister included in a speech some remarks on changes in the arrangement for the release of information. The instructions of the Prime Minister were subsequently given effect in a circular letter from Sir Douglas Allen, then Head of the Civil Service, to all Permanent Secretaries, 6th July 1977 (Hansard—26–1–78, cols 691–4 w). It was summarized in an earlier parliamentary answer by the Prime Minister (Hansard, 26th October 1977, cols 699–700 w).

It is worthwhile recalling where it said, 'When policy studies are being taken in future, the background material should, as far as possible be written in a form which would permit it to be published separately with the minimum of alteration once a ministerial decision to do so has been taken.'

After this, the so-called Open Government of the Cabinet showed signs of life. The Ministry of Defence produced an excellent background paper on the deployment of the KC135 tanker aircraft.

The Department of Health and Social Security have increased considerably the supply of documentation accompanying their Supplementary Benefits Review and the Foreign and Commonwealth Office have released briefs on present policy, plus twenty-three historical studies. Although this, of course, does not satisfy the Freedom of Information Fighters, it is moving in the right direction. The press releases in *The Times* during the period 2nd–9th May 1978, of material available from the various Government Departments, is further proof that the door is opening.

In reply to a criticism of the General Sub-Committee of the Expenditure Committee that the Government should publish information on potential savings from policy changes and report on policy options, the Government in its reply said, 'The Government have frequently stated their intention, and their developing practice is to move towards more open Government. Publication of the facts and considerations which are relevant to major policy decisions which will need to be taken, fall within the existing practice on Green Papers.' (*The Civil Service,* CMD 7117, *p.* 12–13.)

In evidence to the General Sub-Committee, the Institute of Professional Civil Servants said 'it would like to see a much greater extension of the consultative process'. (Minutes of Evidence, 11th Report of Expenditure Committee HoC, 535-11, of 1976–7, p. 552–3.)

Parliament and information

I have already touched on some of the methods which are used by the Government to provide Parliament and through Parliament the world outside, with information. Some are in the form of long-standing replies to parliamentary questions, ministerial statements and speeches in debate, correspondence between MPs and Ministers. However, the late 1960s saw several new developments:

(a) *The publication of Green Papers* intended to provide the opportunity for public discussion of issues **before** the Government had made up its mind instead of afterwards as with White Papers. The first Green Paper, on the Regional Employment Premium, was published in 1967.

(b) *The setting up of new specialist Select Committees.* The volume of Select Committee activity is considerably higher than it was in 1964 when I first entered the House. In particular, the replacement of the Estimates Committee by the Expenditure Committee in 1970 marked a widening in the scope of enquiries. They often take evidence in public, they go 'on circuit' away from Westminster instead of making witnesses come to Westminster, and their documentation has tended to be more voluminous than that of earlier committees, with numerous appendixes and memoranda. The committees have proved an important method of extracting information from the Government and subsequently disseminating it.

(c) *1967 saw the appointment of the Parliamentary Commissioner for Administration* (the Ombudsman) who has access to all departmental papers and who reports to Parliament on cases referred to him, often highlighting defects in the Administration.

(d) *An improvement in the explanatory memoranda* attached to Government Bills was recommended by the Select Committee on Procedure. (2nd Report, 1970–1, page 538, paragraph 22.) The Renton Committee on the Preparation of Legislation thought that such memoranda might be further improved (Report 1975, CMD 6053, p. 56.)

(e) *The occasional appointment of a 'pre legislation' committee, e.g.* on a wealth tax and on direct elections to the European Assembly. Such committees were recommended by the Procedure Committee. (HC 538, 1970–1, p. vii–viii.)

Some informed observers, appreciating what has been done, consider that on both these points much more needs to be done. Professor J. Griffiths states in evidence 'I have emphasized the great need for more detailed information to be obtained by Members both by requiring Ministers to produce written detailed explanations of Bills they introduce and by subjecting Ministers and departmental advisers to questioning in select committees for legislation.' (The Parliamentary Scrutiny of Government Bills 1974, p. 254.)

Whilst most things are improving, there have been developments in the opposite direction, and there often seems to be a tendency for the Government to axe publications because they are too much trouble to continue, *e.g.*:

(i) Annual or periodical reports of Government Departments. At one time most Government Departments produced substantial annual reports with plenty of facts and figures on their activities during the year. Now very few do. Sometimes there is a statutary obligation to produce a report which is ignored, *e.g.* the Government Actuary's obligation to report quinquennially on the National Insurance (now Social Security) Scheme. The last report to appear was for the five years ending 1964.

(ii) Annual Reports of Nationalized Industries. In the early days of nationalization these were very full and contained much useful material. In 1972 the Services Committee of the House of Commons agreed to these reports becoming non-parliamentary papers. They subsequently became larger in format and much glossier but much more slight in content and much more difficult to obtain.

Select committees have not always been satisfied over access to material.

In 1975–76 the Education Arts and Home Office sub-Committee of the Expenditure Committee was refused access to a DES planning paper which had been given to an international organization and to another which had been circulated the Local Authorities and Universities.

> '87. [***We believe that the habit of secretiveness—the instinct to withhold rather than voluntarily to share information—lies at the root of most of the criticisms of DES' consultative processes.*** We realise that this attitude is common throughout the British Civil Service and that it is created by the conventions of government confidentiality which successive administrations have been content to sustain.] These conventions, which are traditional and for the most part unwritten, grew up when government was more autocratic and public opinion less well-informed; they served to "prevent embarrassment". We recognise that to alter the rules would require radical change in the working of the whole Civil Service and that it would be unrealistic of us to make this a recommendation for the DES alone and beyond our remit to advocate it formally for all Government departments. [**We therefore reluctantly accept the present conventions while trying to make their application more flexible.** At the same time we put on record our belief that the weight of public opinion which is beginning to form will in due course bring about a more open form of government in Britain to which the Civil Service will have to conform.]
>
> 88. We recognise that the DES engages in participation in the different ways we have outlined. However, the strength of feeling expressed in the evidence that, to those outside, the door of Elizabeth House does not seem so wide open as to those within, will not have escaped the notice of the DES. [**We share the view that it is not so much new consultative machinery which is required as a willingness to open up public discussion on policy issues.**]' (Education Arts and Home Office sub-Committee of the Expenditure Committee, 1975–6, p. xxxi, 621 HC.)

The recent difficulties over the supply of information on the steel industry received wide publicity. In its second report of this session the Select Committee on Nationalized Industries said:

> '55. Your Committee have repeatedly drawn attention in both this Report and their previous Report to the difficulty they had in obtaining reliable information from both the British Steel Corporation and from Government Departments, and to the fact that neither side was prepared to discuss the options available. They accept that witnesses may have had some legitimate reservation about public discussion of the details of negotiations between the Government, the BSC and TUCSICC in the past two months. They do not accept that this explains or excuses the inadequacy of some of the evidence given during this inquiry and during the previous inquiry. These are matters of great concern.' (The British Steel Corporation HC 127-1 of 1977–8, p. xvii.)

To obtain the figures they wanted the Committee served an order on the British Steel Corporation requiring the production of certain papers, and they subsequently made a further report after the papers had been produced. (Financial Forecasts of the BSC 5th Report of Select Committee on Nationalized Industries, HC 238, 1977–8.)

(iii) Official material on the general course of the economy. The early 1960s saw the starting of new publications on public investment and government lending, and annual surveys of both the UK economy and the Scottish economy continued. All of these have now been dropped. This decade also saw an upsurge in economic planning papers of which there have been no recent examples. However, a barrage of parliamentary questions in 1967 did succeed in prising the official national income forecasts out of a reluctant Treasury, and from December 1969 onwards public expenditure White Papers have been published annually.

As I have already indicated, a back-bench amendment to the Industry Act 1975 required the Treasury to make its macro economic model available to the public, but a recent report commented on the 'lack of openness of the Treasury to the outside world'. The report continued:

> 'Several of our witnesses argued for a more open system of policy making in which the wider public could participate. To shroud alternative policies in silence is not helpful toward the encouragement of more informed public debate. In many parts of government, the practice of issuing Green Papers has become a regular matter. Apart from a number of Green Papers on taxation policy the Treasury is deficient in this respect particularly as regards current arguments about economic policy.
>
> 380. Our wish is to encourage developments which will aid the policy making process; but the results will be wasted if the opportunity is not taken to reveal to the public the trade-offs that are taken to face ministers in practice and the constraints under which they operate. The British approach to budgetary policy and its presentation is a closed system, unlike the open debate that occurs in the United States. It seems to us that greater openness should be a feature of the Treasury's economic analysis.' (Report of the Ball Committee on Policy Optimization, CMD 7148, p. 112.)

(iv) Reports from the Central Policy Review Staff. (Think Tank). Most of these papers are not published.

Information and the public

The supply of information to Parliament is one of the principal means by which information is diffused to a wider public. There is also the Central Office of Information with whose responsibilities I am sure you are all very familiar. A synopsis of its work can be had in *Britain—An Official Handbook*, p. 48. It produces a good deal of material which libraries find very useful: the general annual handbook, cyclostyled brief reference papers on specialized subjects which are updated fairly frequently, and more substantial printed reference pamphlets on rather broader topics such as the social services or the educational system.

The Civil Service has a substantial number of staff in the Information Officer group whose duties include the compilation and dissemination of material to the Press and other media as well as publicity and public relations work. For example, they produce leaflets on social security benefits which are available to all and can be picked up at Post Offices and elsewhere as part of this work, in conjunction with civil servants in other classes who actually administer the schemes. The number of Information Officers rose from 842 in 1961–62 to 1440 in January 1977. (Memo on Estimates 1962–63, HC 142, p. 44. Civil Service Statistics 1977, p. 23.)

Computer developments

The output of information which is published (let alone unpublished material) is now so large that it is difficult for organizations to cope with it. HMSO must be one of the largest publishing houses in the world and all the international agencies such as the United Nations the EEC and The Council of Europe produce large quantities of material. Any organization receiving this material has to devise good indexing to make it accessible to users and the solution in the future will undoubtedly be computerized methods. The House of Commons proposals in this field are set out in a report of May 1977 on *Computer Based Indexing for the Library*, HC 37—1976–7. Under these proposals, nine separate indexes will be drawn together into one, and these will be available in the three buildings over which the Library is spread.

In the field of printed indexes, a great step forward in making government statistical information more widely known was the publication in 1976, for the first time since 1938, of a *Guide to Official Statistics*. The second edition is due out shortly. This was compiled as a result of a recommendation of the Estimates Committee in its Report on the Government Statistical Services of 1966, so it owed its origin to a parliamentary initiative. Although it took ten years for the recommendation to be implemented, the Guide was very welcome when it finally appeared. Incidentally, it was the first publication from a Government Department to win the L. A. Besterman medal for an outstanding bibliography.

To summarize here—I do not imagine there should be any doubt that there has been a general trend toward more open consultation before decisions are taken by the Government. Since Fulton in 1969, there has been an increase in the number of Green Papers and other consultative documents. Government Departments now regularly disclose—with proper authority—a great deal of information in addition to what is formally published through HMSO for the use of the media, interest groups and individuals. Depending on the subject, Departments also allow 'bona fide' research workers access to relevant files.

Open Government

In seeking after more Open Government it may be useful to consider the criteria under which the various aspects of information have been judged:

A. **Top secret**
Definition: Information and material, the unauthorized disclosure of which would cause ***exceptionally grave damage*** to the nation.

B. **Secret**
Definition: Information and material, the unauthorized disclosure of which would cause ***serious injury*** to the interests of the nation.

C. **Confidential**
Definition: Information and material, the unauthorized disclosure of which would be *prejudicial* to the interests of the nation.

D. **Restricted**
Definition: Information and material, the unauthorized disclosure of which would be ***undesirable*** in the interests of the nation. (This is due to be altered.)

Open Government means many things to many people, from the 'Freedom Fighters for the Freedom of Information' campaign to the most secretive of Ministers. Open Government has become a popular slogan, the general intention of which is very clear. The practical meaning of Open Government has, as yet, no definition and is, to say the least, somewhat obscure. Significantly, it is usually those who are the strongest advocates of Open Government who are least precise as to the kind of information which should be kept secret or that which should be disclosed.

In any move toward more Open Government (and the Government is moving in this direction) and more and more information, it is essential that we make known what information we want. I would say that the fullest possible information must be given to Parliament about Government policies and decisions and also a wider dissemination made of the factual background to those policies. This has been promised by the Prime Minister. By and large it is the feeling, sometimes quite erroneous, that information is being withheld that causes suspicion, yet, in the plethora of documents, papers, memoranda and files that come before the Cabinet and its sub-committees, it would be impossible to publish everything.

The question of what ought *not* to be disclosed was examined in 1964 by a Working Party whose conclusions may be thought the more significant by virtue of their independence of Government and by the fact that they were representative of the two interests—the law and the press—to whom official secrecy is most repugnant. This was a Joint Working Party of JUSTICE, the British section of the International Commission of Jurists, and the British Committee of the International Press Institute; it was chaired by Sir Hartley Shawcross and comprised three lawyers of considerable experience in public affairs and three editors or experienced newspapermen. Their analysis is perhaps worth quoting at this point:

> 'It appears that there are five main types of information that we have to consider:
> (1) Information prejudicial to the security of the State, *e.g.* defence and police.
> (2) Information prejudicial to the national interest, *e.g.* foreign relations, banking and currency, commodity reserves.
> (3) Information which through premature disclosure can provide opportunities for unfair financial gain by private interests.
> (4) Information which is confided to Government departments on promise of non-disclosure.
> (5) Information which is not prejudicial to the national interest or to legitimate private interests, and relates solely to the efficiency or integrity of a Government department or public authority.'
>
> Reported in *The Law and the Press,* London: Stevens, 1965, since reprinted.)

It is not susprising that the *Justice Report* thought it reasonable that all five categories remain within the provisions of the Official Secrets Act. This is just one example of the difficulties inherent in moving toward more Open Government. [Another is the Freedom of Information Act in the USA which has made it difficult for public men to keep their income-tax returns private and for newspapers to keep their own secrets.]

Finally, I imagine many of us assumed that the Government in amending the Official Secrets Act would go much further than what is proposed in CMD 7285 *Reform of Section 2 of the Official Secret Act.* There, in paragraph 1 of the introduction, the dilemma is stated.

> 'Reform of Section 2 of the *Official Secrets Act* 1911. **Introduction**—in a democracy, people should have information about the workings of government. Without it, they cannot call

> their representatives to account and make informed use of their rights as citizens and electors. Nevertheless all governments find it necessary, in the national interest, to keep some information secret. In the wrong hands certain information could undermine our vital interests or even our safety as a sovereign and independent country. Therefore, for us, as for all democracies, there is an inescapable tension between the need to keep some information secret and the requirements of openness if people are to participate in government as they should. A balance must be struck and it has to be reviewed from time to time to see that it is in keeping with current perceptions of the threat to our security and the needs of democracy.'

The Official Secrets Act is concerned with the *unauthorized* disclosure of information—worth noting. It places no restrictions or constraints on the amount of information a Government may make available. All governments have secrets which they have a duty to protect. As the functions of Government increase and multiply, so do the secrets. HM Government confine the White Paper to amendment of Section 2. Since World War II ended, Section 1 has assumed much greater importance, simply because, in today's world, we could be well nigh totally dependant, for our survival, on being able to control the dissemination of security information and classified information. We live in an age where the ingenuity of man has created weapons or devices which could destroy the world as we know it. Section 1 may prevent treachery on the part of well-intentioned people, often moved by the highest motives, who fail to accept the obligation they owe to their own country. I do not know whether Section 1 requires extension or amendment. I am content to leave it where it is and go on to Section 2 and its reform as proposed in CMD 7285.

The proposed reform has had a mixed reception from the Press and its adjuncts and from all sides of the political duodecahedron. I imagine if a Bill based on CMD 7285 was presented to the present Parliament, it would be much amended. Press comments were as follows:

Labour Weekly—'Still too many secrets', 'White Paper takes a pasting'.
Times—'Government plan draws angry reaction'.
Daily Mail—'Secret government'—'The secrets gag is still tied tightly'.
Glasgow Herald—'MPs turn on Rees over secrets reform'. 20/7/78.
Guardian—'The secret of eternal evasion'—(editorial). 'Left Wing furious at Rees over secrets' (Simon Hoggart). 'Not so open secrets'.
Observer—'Whitehall clings to OUR secrets'. 23/7/78.
Telegraph—'Anger over limited secrets plan'. 20/7/78.
Times—'Secrecy of power'.
Financial Times—'Keeping the secrets'.
Mirror—'Labour MPs lash at Rees over secrets'.

The expected criticism did materialize and six years after the Franks Committee had called for the reform of the Official Secrets Act we have the Government's proposals for an Official Information Act to replace the 'catch all' provisions contained in Section 2 of the Official Secrets Act. The proposals hardly live up to the promise in the Election Manifesto of 1974 and certainly do not replace the Official Secrets Act 'by a measure to put the burden on public authorities to justify withholding information.'

The White Paper does none of this. But the Government does stress in paragraph 40 that reform is a necessary preliminary to greater openness in Government. The major changes from the Franks Committee are that:

(a) the disclosure of economic information of any kind should no longer be liable to criminal prosecution;
(b) the legal sanctions, which made any *unauthorized* disclosure of official information a crime, and which deemed that even the unwilling recipient of such information was a criminal, should be abolished.

Of course unauthorized disclosures about internal security, intelligence, the confidence of private citizens, defence and international relations remain under the threat of the law. New legislation should provide protection for the citizen from the disclosure of information held by the Government, *e.g.* damaging information about private citizens or organizations which is gathered by the Police but does not lead to a prosecution, also personal details given to social security or income-tax authorities. The White Paper proposes that Personal Information be a restricted category. I would like to see a statutary provision for the protection of Personal Information. (Prisons will still remain enclaves of protected secrecy.)

Regretfully, it will be the Minister alone who decides how much we may know. I would have preferred an independent body to decide classification where a prosecution is pending. This procedure has been standard in British politics for a long time. But,

> '. . . there is this inquiry which I have been entrusted with *alone*. It has the advantage that there can be no dissent, but it has two great disadvantages: first, being in secret, it has not the appearance of justice; second, in carrying out the inquiry, I have had to be detective, inquisitor, advocate and judge, and it has been difficult to combine them. But I have come to see that it has three considerable advantages. First, inasmuch as it has been held in private and in strict confidence, the witnesses were, I am sure, much more frank than they would otherwise have been. Secondly, I was able to check the evidence of one witness against that of another more freely. Thirdly, and most important, aspersions cast by witnesses against others (who are not able to defend themselves) do not achieve the publicity which is inevitable in a Court of Law or Tribunal of Inquiry.' (Lord Denning, CMD 2152, paragraph 5.)

[In fact there is possibly a case for the creation of an administrative decision of the High Court as an appellate court relating to the present system of administrative justice. This would not replace the present Ombudsman system, where maladministration rather than illegality is involved.] The quote from Lord Denning's Report highlights his dilemma. In larger measure it is also that of the Government.

> The past century and a half have seen an enormous growth in the functions of central government in this country. Throughout that time, and today more than ever, one of the most complex and difficult problems has been that of reconciling efficient executive government with democratic control. In recent decades there has been a marked tendency on the part of the executive to interpret the public interest more in terms of its own efficiency than in terms of popular control. A by-product of this tendency has been a growth in executive secrecy. . . . The ultimate danger of executive secrecy in a much governed country is that it denies the knowledge essential for an informed public opinion and that it inhibits effective scrutiny and criticism of the Government and Administration.' (*Not in the Public Interest.* D. Williams, p. 9, 1965.)

Conclusion

Much has happened since 1965, and is still happening, as I have tried to detail in this paper. Much will still have to happen. Tremendous improvements have taken place within the various Government Departments in supplying the demands made on them for information from Parliament and, through Parliament, people are receiving and acting upon more information than was envisaged in 1965. The possession of information and the ability to deny it to others is, to a politician, equivalent to the possession of power.

The White Paper *Reform of Section 2 of the Official Secrets Act* is in many ways a disappointment. But an official information act is promised—Labour Conference Paper. In today's world, with all its uncertainties and lack of trust, the Government's caution is understandable. Nevertheless, in the field of the Government's attitude to information we must work toward and look forward to a situation where in the context of democratic government, the general principle should be: *anything is revealable unless positively prohibited.*

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The information industry: what it contributes, where it is going, its impact on information provision in the public sector: a general and official view from the standpoint of the operator and producer

Raymond K. Appleyard

Director-General of Scientific and Technical Information and Information Management, European Communities Commission

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Introduction

THE COMMISSION OF the European Communities plays a dual role in the information industry due to its resemblance to and interaction with governments:

- on the one hand it is continuously assembling a vast amount of information. It is thus substantial both as an information consumer and as a producer. The Community's Statistical Office alone releases some fifty publications at regular intervals;
- on the other hand, and more important from a longer-term point of view, it influences increasingly the environment within which the information industry operates inside the Community, through projects and through regulations.

The first role compels us to experience at first hand—as do all levels of government—the difficulties, problems and opportunities the information industry faces today; this may be disagreeable but is a big help in the wider responsibility of creating a favourable environment for information providers and 'consumers' in the Community.

I propose first to scan quickly what one may call the 'information industry', and then go on to discuss its growing role in the economic life of the European Community. This will go some way towards tackling the very broad question of 'what the information industry contributes', leaving aside the subtler aspects of culture and quality of life. We will then take a closer look at recent trends in the industry and will finally turn to a set of issues in the public sector which have either been created or become more acute because of these developments.

Let us first glance at the information industry from a general point of view.

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Information industry

During recent years the economic importance attributed to the information sector has ranged from gross underestimation to wishful thinking on the part of some protagonists trying to back up over-imaginative hypotheses.

While a broad definition of information-related activities, as all activities primarily involved in the production, distribution and consumption of knowledge of all kinds still seems acceptable to me I have some definite doubts about Machlup's view[1] which allocates not only research and education, but also architecture and banking services to the information sector, thus pushing the share of that sector up to 40 per cent of total GNP in 1970 for the US; nor would I think Porat's definition[2] more useful, when he generously adds the whole of Public Administration and thus turns nearly 50 per cent of the 1980 US active population into information workers.

I propose, more modestly, to turn to a more traditional scheme, and ~~to~~ subdivide information-related activities into four major sectors:

1. creation of information and knowledge; I would further subdivide this into ephemeral 'mass media' information, and more 'durable' information which I may also call scientific, technical, economic and social information of all kinds, *i.e.* STI in its broadest sense;
2. 'intellectual investment'/education, with all its branches—university, training of all kinds, primary education;
3. transmission/communication, with its different functions of storage, 'value-adding' presentation (cataloguing, indexing, etc.), dissemination of information; again we must differentiate between mass media—newspapers, radio and television—and the facilities created mainly for transmission of more durable information—specialized libraries, information centres, and now also data-base supply and operation centres;
4. support functions, *e.g.* paper industry, EDP and communications industry in so far as they are concerned.

Unfortunately the statisticians are lagging behind current developments in the information sector and it will be a matter for future research to quantify the shares of those four areas in total economic activity; however, this scheme facilitates the definition of that aspect of total information activity which I intend to discuss more closely; 'durable' information (*i.e.* STI in its broadest sense), and the industry which is handling it: information centres, libraries, and publishers.

Information industry—its growing role in economic life

At a time when economic growth and unemployment rates make the front page news, any study of the information industry's contribution is obliged to concentrate on economic questions. To put it more precisely, let me ask, what is the role of the information industry in the complicated inter-relationships which determine our economic destiny?

Creation of knowledge by itself has no immediate economic impact; however, it becomes a major component of economic progress, as soon as it is turned into a source for innovative processes or decisions of whatever kind.

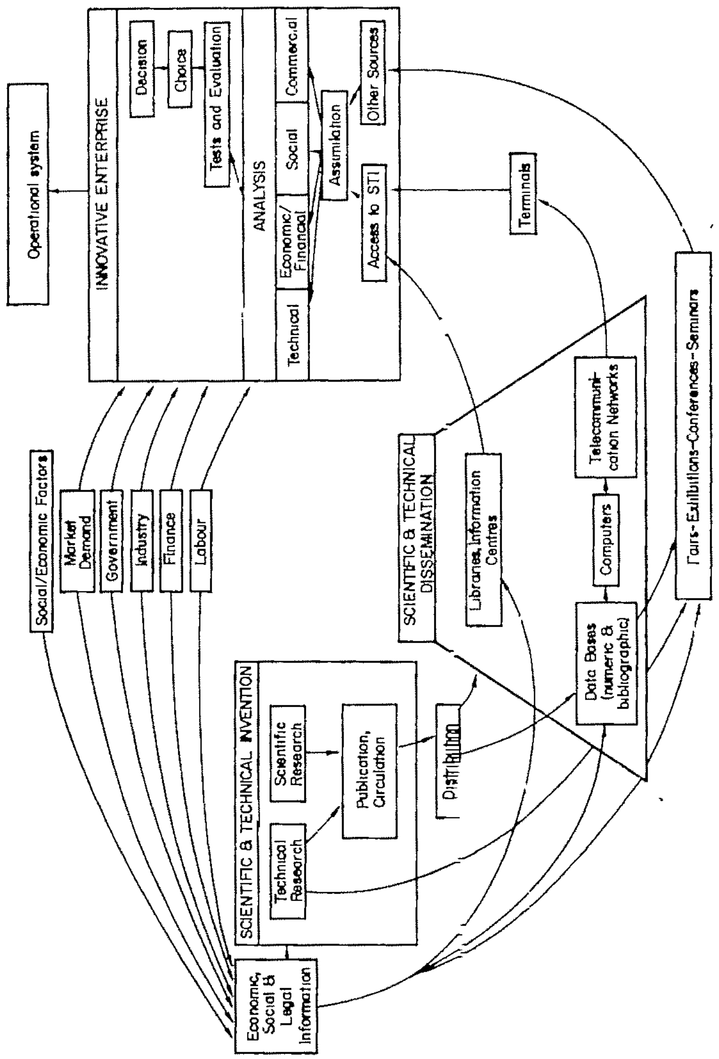

FIG. 1: *STI and other information—model of flow patterns*

Drawn from a recent study by the French Professor A. Piatier,[3] Figure 1 tries to outline the major information flows and relationships of the innovation cycle where we are dealing primarily with new technology and the related STI. The lower loop details the flow of information from creation of scientific and technical knowledge via publication and transfer to the innovative 'consumer', and thus is at the centre of the present discussion. But the upper loop is a necessary complement: all that information on other factors in innovation which are vital in their own right for the potential innovator—market demand, government policy and promotion, competition, financial opportunities, manpower, social development. One feature of such schemes is that they show how much the exploitation or value of specific categories of information depends on being able to combine them with other categories. Hence the great present success and the certainty of future concentration upon supply of and access to very wide packages of both instant and durable information.

Let us look more closely at the lower loop; the information industry, as defined here, plays an essential role in the publication/dissemination cycle which splits into two major branches:

1. traditional dissemination via libraries and information centres which still is by far the most frequent way of transferring information;
2. the emerging dissemination techniques using electronic storage/telecommunications to which we will return in more detail.

However, there are in addition two 'marginal' flows which I would call 'semi-public' dissemination and which play an important (sometimes primordial) role:

1. direct contacts between the innovator and the source of information largely bypassing the publications;
2. special information channels such as seminars, conferences, exhibitions, which, though efficient and speedy for a limited number of specialists, exclude a majority by reason of cost, time and distance.

The growing role which the information industry will play in innovation and economic and industrial development at all levels is one reason for enhanced government interest in this field; it is, indeed, a strategic sector governing the advance of many—if not all—others, and it behoves governments individually and collectively to treat it as such. Quite another reason is the recent dramatic change in the industry itself: massive application of data-processing equipment and methods, and the intervention of modern text processing and telecommunications schemes in both the publishing and dissemination sector of the industry.

The new fact—convergence of DP-text processing/telecommunications and traditional information handling

The traditional ways of disseminating information—the main line via publishing/libraries and the more restricted channel via direct contact—have their longstanding merits, and I would not join the ranks of those who plead for ousting the library department and putting a terminal on the manager's desk instead.

However, there are some major deficiencies in traditional information handling which are becoming more and more apparent:

1. slow responses to a query and also incomplete coverage by the information centre exist and are aggravated by the information explosion which has already been a topic at this conference. It is characteristic that, according to a recent field survey carried out for us[4] in the EEC 51 per cent of actual users said thay had gone on-line because of speed of response, while 21 per cent and 17 per cent respectively also said that accessibility of data and the wider range of data available had been major incentives. The economies of on-line searching were mentioned by 34 per cent;
2. exclusiveness of information for bigger companies. It is rarely realized that the present channels heavily favour the big company which has access to a wide range of material as well as the manpower and financial backing necessary to attend conferences and seminars and build up personal contacts. This contrasts with a spreading belief that a major innovation potential resides in the medium-sized enterprises;
3. a growing disparity between heavily favoured regions with easy access to publicly provided information, and distant areas with very limited access. This problem is aggravated inside the EEC by discrepancies in development on the national level.

These deficiencies will be moderated by progress in the telecommunications/networking techniques, automatic retrieval and text processing, leading to the concept of advanced computerized information centres with on-line network access, as you know, and to projects such as our own Euronet.

I do not pretend that on-line access and data bases will in the near future eliminate the problems mentioned; traditional techniques will retain their importance, and on-line searching will be one of many means of information retrieval. However, on-line will alleviate the situation.

The reason we, in the European Communities, made this particular segment of information industry the centre of our action, with two Action Plans running successively in 1975–7 and in 1978–80, was our conviction that it was an area where immediate action was needed both to prepare the infrastructure and to work towards the practical market arrangements which are required by this new type of service. We also believe that this sector of the information industry—at the moment—is the fastest-growing one and the one most menaced by competition from outside the Community. It is also a trend-setter which announces the major problems to be solved by the whole of the industry in the decade to come: *an orderly transition to new electronic media, and creation of the necessary legal and economic structures.* Thus, for the Community, 'on-line', besides being an immediate need, is also a test field where a start can be made to solve more far-reaching issues.

Keeping in mind the general confusion existing about the present quantitative impact of on-line searching of data bases in Europe, let us look at some of the more recent data available to us.

Figure 2 shows the number of bibliographic searches only, as data on access to numerical data bases is extremely unreliable and is therefore not included

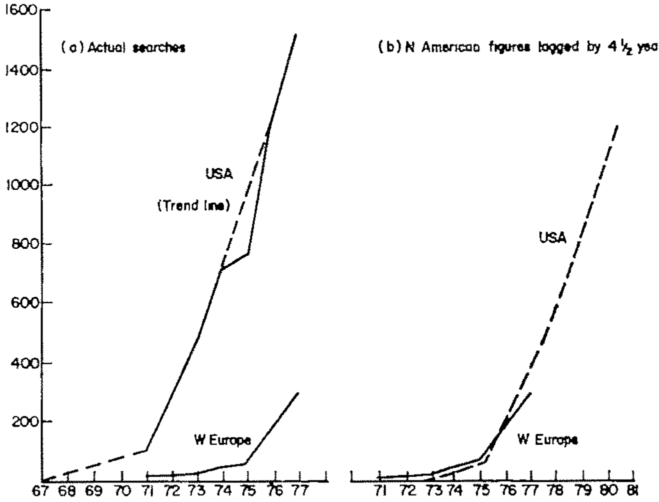

FIG. 2: *The on-line market (thousands of searches)*

here. The European development follows neatly the US trend-line, with a 4.5 year lag. 1977 figures are estimate at 300,000 searches total in Western Europe, compared to 1.5 million in the United States. On the basis of the US trend-line the European figure will go up to 1.2–1.5 million searches by 1982.[5] In financial terms, the total revenue, from 'on-line', of information centres and data base producers on the European market will grow from an estimated 1.5–3 million pounds in 1977 to a total of some 15 million pounds in 1982. This compares to a turnover world-wide of the leading US service for 1977 of an estimated 12.5 million pounds or more. Let me add that more than 50 per cent of the total turnover of the European market is now believed to go to the three major US services, with no Pounds Sterling coming back and that this may be the worst showing in balance of trade which the Community is currently experiencing in any branch. While these figures confirm that on-line in Western Europe is still a very limited but fast-growing sector of the information industry—and, of course, including searches of numeric data bases would change the quantitative aspect considerably—the new technique seems to provide a remarkably high level of satisfaction to current searchers, now estimated at 6,000 to 9,000 in the Community. In the field survey already mentioned, based on some 250 interviews in the Community, 71 per cent of users ranked the quality of the existing data bases as 'good', and only 2 per cent as 'inadequate'. However, it should be stressed in this context that more than 95 per cent of the staff behind the terminal are still trained information specialists; this presents some problems. My personal belief is that the ultimate future market must be direct to the simple-minded user himself, allowing him, *inter alia*, to browse. But that will require a great effort to simplify and to 'standardize' (more or less) search methodology, if it is to be combined with the provision of broad packages of data bases.

Let us now turn to the major issues opened in the public field.

Public issues

The introduction of on-line services in the European information industry raises some of the problems encountered generally in innovative processes:

- build-up of sufficient market awareness and demand; this proves often to be the most costly part of the operation;
- tackling the difficulties problem of subsidy; this is complicated in the Community by the traditionally high degree of public control of the information sector; can this and should this continue? And in what form?
- creating the required infrastructure; it is in this area that the Community effort has so far mainly been concentrated.

The Community's share in the development of the Euronet telecommunications facilities is 2 million pounds while the consortium of the Community PTT-administrations have taken on the rest (0.9 million pounds); as you may know Euronet is now experiencing some teething troubles and the start of network operations has been somewhat shifted by our PTT friends to mid-summer next year. Apparently no network project completely escapes the painful experience of shifting starting dates, as our banking colleagues from the Swift project will confirm. But it will reassure some people here to know that initial testing by host computers is expected to be little, if at all, delayed.

According to common experience in this type of innovative project, marketing the product will be the most essential and also an expensive part of the operation. We have found that this needs some degree of public subsidy and we are ready to contribute on a Community level; however, our share can only be effective on the longer term if national authorities and services contribute their own effort.

Despite the present limitation of the market, supply is building up in the Community at a surprising rate. Out of twenty-five centres interested in offering on-line services via Euronet, and this number is growing, the commercially most viable and internationally known ones such as BLAISE, DIMDI, and now also INFOLINE, have already signed firm commitments to join Euronet, and others are in the process of signing. They met recently in Luxembourg to hammer out final details regarding their operations via Euronet, and, as we hope, to develop into a loose association.

Modern on-line information services will in part be oligopolistic in nature, due to the economies of scale they must achieve and to the initial limitation of the market; this poses problems in a Community which upholds the principles of open and fair competition and which aims at reducing public subsidy to a minimum. It is a phenomenon which is also observed in other sectors of the information industry where expensive techniques are introduced which depend on large-scale operation. Here again, the 'on-line' sector just acts as an advance indicator of a general trend in the industry. But it is complicated, as it will be in other sectors of the industry, by the distinction in ownership and operation between the data-base, involving a very high expenditure, often of a specialized intellectual kind, and the information service based upon it: to say nothing of some quite peculiar copyright problems! We have tried to overcome these problems by introducing a conciliation procedure in case of 'unfair' competition to which every information service operating via Euronet subscribes.

However, I think this issue points to a vacuum in the legal structures and acknowledged 'codes of behaviour' which is generally encountered by the most advanced parts of the information sector. Another example in the on-line field is the sometimes discriminatory conditions under which data bases are presently being made available to data base operators. We have made the creation of a fair and proper 'common market for information' a principal objective of the EEC second Action Plan in the field, and we try by patient persuasion to steer the information community towards this goal.

The 'on-line' market is very young. This is illustrated by the wild variations in data-base royalties during the last two years, with data-base suppliers apparently testing the commercial value of the electronic by-product of their hard-copy publications; they seem to be trying to establish a proper ratio between the price of the traditional main publication and its data-base offspring and they may well end up considering their data-bases as products in their own right. In this way the production conditions of bibliographic data-bases may gradually join those of numerical data-bases which have originated more in the field of data processing than in the traditional information industry.

I would suggest that the re-evaluation of bibliographic data-bases which is taking place is something like the tip of an iceberg indicating a much vaster change which is taking place in the industry on a wider scale: introduction of electronic media additional to the traditional hard copy ones. It is also raising problems of a general nature, such as adapting copyright rules to cope with the new situation. We in the EEC Commission have our first confrontation with this problem in the area of hard-copy supply in support of on-line systems, and we have recently finished a study in the field. We aim, not at establishing a rigid structure in an area still in development, but at finding a pragmatic, internationally harmonized solution within the Nine Countries such as an appropriate system of cross-royalties.

The growing importance of advanced information technology in the economic life cycle has given high priority to seeking a balanced development of the new facilities on the Community and international level. As I have already mentioned, our showing in balance of trade for 'on-line' is bad. To underline this, let me recall that out of 55 million records or so now stored on electronic/bibliographic files, 80 per cent are provided by US-originated data-bases. Assuming that 55 million records represent an investment of 50 million pounds and more, this indicates the kind of investment gap Western Europe is currently facing and recalls the initial days of the data processing industry in the late fifties.

A closer analysis reveals even more alarming details. Europe is as rich as North America in the number (though not the size) of bibliographic and numeric bases available in the sciences. It has far more technological bibliographic bases. But it is heavily deficient in numeric data-bases in the area of business and economics (11 data-bases accessible on European hosts, compared to 92 on US hosts).

I think these differences reflect two basic factors:

1. the delay in the development of the European market. It is established

that on the US market the big scientific bibliographic bases came first, followed by extensions into technical areas, then by the much more recent growth in alpha-numeric resources;

2. the basic differences in the present bibliographic and numerical data-base business. Bibliographic data-bases have been largely created as by-products of the traditional publishing process, where the European information industry is well established. Numerical data-bases are more rooted in the data-processing industry and thus need a new kind of entrepreneurial activity which up to now hardly exists in Europe.

Thus, as I see it, a major factor in gearing the Community's information industry to meet the new challenge will be the search for this new type of daring entrepreneur, and for the financial arrangements to help raise the very high capital investment required for entering the market. On the Community level, we are trying to prepare the ground by creating an essential element in his success, a Community-wide market in information.

Conclusion

I have, admittedly, covered only part of the ground suggested by my ambitious topic. I have deliberately omitted the discussion of private company information systems which still soak up 95 per cent of companies' total expenditure on modern information systems, and I have not discussed the interesting question of how far access to outside public information systems can substitute for, complement, or be combined with, in-house data-base operations. I have also not spoken about the impact of modern information technology on employment conditions in the industry. Up to now the share of 'on-line' is too small a part of the industry to influence job figures. However, all of us have observed the trouble in parts of the publishing industry early this year caused by introduction of computer setting on a larger scale, and I think that the job-problem risks becoming more urgent in the future. Much of what has been discussed here arises from considerations of one part of the present broad technological movement arising from the combination of computer techniques, micro-electronics and modern telecommunications. But let us not forget that other consequences, perhaps in a longer term, will flow from this same combination. Take, for example, the UK Viewdata, German Bildschirmtext, French Antiope development. I would be prepared to take as an act of faith that the mass private citizen market for these will exist and will be satisfied, with enormous social and economic consequences for us all. But when and under what conditions? What are the desires and price elasticities? Where is the coherent strategy for their introduction?

Likewise for another development, of the greatest importance to the economic efficiency of industry in general—the so-called electronic mail. There are signs in the US of a coherent and intelligent strategy for its introduction. Do they exist in Europe?

Perhaps the history of on-line access to information, which we are living today, will have lessons for these future areas.

There are other technological revolutions around the corner which could complement 'on-line', such as teleconferencing, but in my view this still is distant in economic terms. So let me turn back to the more immediate future; (I firmly believe that, with all its problems, the European information industry is moving ahead; and you may be sure that we at the Community will do whatever we can to help.)

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Growing user information dependence and its impact on the library field

Herbert S. White

Professor, Graduate Library School, Indiana University

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Introduction

THE NOW WIDELY ACCEPTED description of the new post-industrial society as defined by Daniel Bell clearly points to an emphasis on the provision of services rather than on the production of goods. In part this is true because improved technologies for agricultural and industrial production allow a smaller and smaller proportion of the population of the Western world to supply even the increasing demands for the food, the clothing, the shelter, and the material goods which at one time took all of our strength and all of our energies. The growing emphasis is on the provision of services—in part because having others do things for us is an indication of our growing affluence—in part because the number of potential services increases as our imagination and desires constantly stay one step ahead of what we have—and in part because increased efficiency and increased performance have also brought with them increased complexity.

Through the nineteenth century and into the early twentieth, man was relatively self-sufficient and in control of much of his own course of action. Now we sit by the side of the road for several hours waiting for a tow truck, because the car has broken down and because arrangements under the hood have become so complex that one can't even get at anything any more. One hundred and fifty years ago our forebears might have been able to build their own house. Now we wait two weeks for someone to come and give us an estimate on fixing a squeak in the heating system.

How does all this apply to information? We certainly know that the provision of information, in its various guises and forms, is among the most rapidly growing if not the most rapidly growing of the service professions. Although we might find the definition of information somewhat too broad for the concerns of this audience, it has been suggested that we already spend or are about to spend more on information (if you include the media) than on capital goods.

The growth of information

However, even applied to the more narrowly prescribed bounds of information as we are more accustomed to using it, the growth has been startling. Georges

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Anderla[1] has projected the world's literature growth in science and technology at eight per cent per year. While others have quarrelled with this projection of rapid increase, Dale Baker[2] of the Chemical Abstracts Service reported in 1976 that the chemical literature, at least as covered by his service, was still taking less than ten years to double, a projection which closely matches Anderla's. Baker reports that, in 1975, Chemical Abstracts included the abstracts of 324,000 papers and books, and with the addition of patents, over 454,000 total documents, more than twice the figure for 1965, and a rate which will have put just this one information service at a level of over 1,000,000 document announcements per year by 1986. However, the growth does not simply stop there. Because, with the increased availability of machineable data bases, our access to this growing file of literature has also increased. To what extent? Nobody really knows. But certainly we are beyond the constraints of information access as defined by the holdings of the card catalogue of your local library for books, and shelf copies of abstract-index journals for the periodical literature. The growth of data bases has been estimated by Martha Williams,[3] in her 1977 article in the *Journal of the American Society for Information Science*, to be from fewer than twenty in 1965 to over 300 publicly available data bases in 1977, with better than fifty of these now available on-line. These are, of course, far and away the largest of the data bases.

Lee Burchinal,[4] the former head of the US National Science Foundation's Division of Information Science and Technology, projects even larger numbers than Professor Williams. He goes on, in a paper presented at a US–India binational seminar, to describe the startling growth in on-line searches. In the US alone, and from a beginning in about 1968, on-line searches grew to 1,000,000 per year in 1975, and are expected to surpass 4,000,000 by 1980. Where is the potential limit? It is impossible to predict with any accuracy, and experience tells us that, in dealing with new concepts, while we are usually overly optimistic in predicting what will happen in the next year, we are invariably well below target in estimating what will happen ten years from now. Even assuming that all of the 1975 searches were performed by or for scientists or engineers, an assumption both simplistic and inaccurate, it would still only amount to a half a search per year per scientist or engineer, and even the 1980 projection of 4,000,000 searches only permits the average technical professional one search every six months.

It seems inevitable that, in an atmosphere of so much growth and development, change will be rapid and continuous. It seems almost as inevitable that complexity will increase, despite the protestations that this ought not to happen. Part of the reason, it seems to me, is built into the growing inter-relationship of subject disciplines, at the very time when these disciplines become ever narrower and more specialized. Another part of the reason comes from the political and economic factors which govern the generation and dissemination of data bases.

Data base development

I think it can be argued that rapid development of machine-readable files has been greatest precisely where artificial interference and constraint has been the least. Data base development, in the western world, tends to come from three sources—government, professional societies, and private industry. While the publicly avowed motivations and value systems of professional societies versus private corporations may differ, in reality the factors which drive decisions are basically the same. In both cases there is usually a genuine belief that the data base being created will meet a need—if it did not how could you sell it? The need for financial validation is equally important. Neither societies nor companies have hidden gold reserves from which to finance a money-losing abstract-index service, and members of a society are as loath to subsidize a charitable undertaking as are stockholders in a corporation. Studies which the Indiana University Graduate Library School Research Center has undertaken for the National Science Foundation on the economics of the publisher-library interaction convince us that the economically motivated decision model differs only in the nomenclature applied. What is labeled a profit in industry is called a surplus in professional societies, and both are essential if there is going to be further innovation, development, and growth, as there must be in any meaningful and dynamic system.

It is interesting and coincidental that, as I was preparing this article, a regional network of academic libraries in the United States was criticizing *Psychological Abstracts*, a professional society product, for a price increase for on-line data base access. I am not sufficiently familiar with the financial constraints, nor do I want to be, to be able to comment on the validity of this price change, but the simple and perhaps simplistic suggestion that the publisher should forgo a price increase because the information for the data base is already in machine-generated indexes and therefore relatively free of cost ignores both the economics of publishing and the factors which motivate pricing decisions. The determination of the extent to which a database competes with, or perhaps in some instances enhances, the sales potential of published indexes, is part of the overall marketing strategy which any publishing organization must develop, professional societies no less than commercial organizations.

It becomes an absolute essential that for a data base to be developed effectively, to meet the aims of its originators, it must be developed selfishly. By that I mean that if the charter which your program has set for itself requires the inclusion of certain information, that inclusion is no less valid simply because some other data base also decides, for its own reasons, to cover the same information. In fact, while the material being included may be the same, it is likely that the difference in orientation of subject scope will almost automatically account for differences. Even data bases which presumably cover relatively neatly defined subject areas are not immune to interpretation. Take chemistry. Does anyone really know where chemistry ends and biology begins? Or physics? What is the difference between physical chemistry and chemical physics? If academic departments within universities cannot agree on lines of demarcation, it is hardly reasonable to expect that producers of abstract/index publications and data bases who, if they err, must err on the side of inclusiveness, would do so. The problem is further compounded by the emergence of interdisciplinary problem-orientated data bases, concerned with such broad topics as energy, pollution, and nutrition. It can be assumed that virtually everything covered in these data bases will be contained in subject data bases as well, although the emphasis of approach might very well be totally different.

Government-produced data bases generally show this same lack of consistency, depending on the mission statement of the agency involved. Thus, within the United States, the Department of Defense concerns itself with controlling and announcing all documents produced by and for the Department of Defense, regardless of subject, while the National Aeronautics and Space Administration is concerned with all documentation related to space, regardless of originator, and definitely including Department of Defense reports concerned with space, as NASA defines it. I am sure that Great Britain can point to similar examples.

Redundancy of information

Producers of abstract/index tools and data bases have been quite defensive about the extent of their overlap coverage. A study undertaken by the National Federation of Abstracting and Indexing Services[5] and published in February 1977 points out that, among fourteen major scientific and technical abstracting and indexing services, only 21 per cent of the 26,000 journals scanned were scanned by two or more services. Furthermore, only 23.4 per cent of the articles in those journals which were covered by more than one service were in fact included more than once, a two-level approach which could lead you to conclude that less than 5 per cent of the articles were in fact double covered.

Perhaps so, but it would also be of significance to know whether or not these articles were any more important (in terms of frequency of retrieval) than the body of literature as a whole. I suspect they might have been. In addition, the fourteen abstract/index services in the survey (thirteen US and one British, INSPEC) represent primarily subject disciplines, with perhaps three or four which could be considered interdisciplinary or mission-oriented to any appreciable extent.

In any case, the presumption that duplication is unnecessary duplication is easily open to challenge. As the NFAIS report points out

> 'Even when two or more services do index the same article, this does not really imply *unnecessary* duplication, because the intellectual analysis of the article content by each service is intended to serve the particular needs of its users. For example, a research chemist's approach to a secondary service for identifying the literature he needs may be entirely different from the approach by an engineer, whose subject terminology may be completely different from the chemist's.'

Any assumption that an item of the literature belongs in one abstract/index tool or data base only is probably an extension of the premise in librarianship that every item in the collection deserves one particular place. We therefore spend a considerable amount of time worrying about where exactly to park a specific item, letting users then worry about figuring out where we have hidden it. The totally reasonable suggestion that perhaps we ought, if we have more than one copy, to place one in each of several locations within the system, is of course anathema to the values of the library profession.

Despite the somewhat defensive nature of the NFAIS study, and the almost obvious relief with which the investigators report the relatively small amount of overlap, it raises in at least this commentator's mind the perverse thought that perhaps there isn't overlap enough—that perhaps some degree of redundancy is still one of the most effective techniques for insuring retrieval. Those of us who have worked with retrieval problems from subject files probably realize, although we may be loath to admit it, that only the multiple approaches provided by computerized access have enabled us to do meaningful subject searches. The one or two or three necessarily broad subject headings attached to a manual catalogue card make searching of subject headings highly unprofitable, and many if not most subject searches are in fact carried out through the author or the title file. If any of you doubt me, find a divided catalogue in a research library and observe the number of patrons. Chances are, the people you find at the subject catalogue are in fact library employees putting more cards in.

Direct user access

One of the main reasons we continue to be concerned about the avoidance of duplication, and about the growing number of data bases, is because we are still wedded to the forlorn and injudicious hope that somehow we must allow the researcher to maintain direct contact with the publications in this field. Forlorn because there is little evidence that he is either interested or competent in doing so. Injudicious because the best hope for this profession and its practitioners, be they called librarians, information officers, or documentalists, is that of assuming the crucial role of information intermediary between the researcher and his literature

Strategies for the development of information systems have consistently been based on the premise that the researcher or scholar is anxious to have more and newer esoteric tools to permit him to access additional information sources. I am sure that there are some individuals who fit that description, but most researchers and certainly decision-makers with whom I have come in contact are not looking for more to read, they are looking for ways to cut down on the amount of reading they are doing now. This is behind much of the concern about overlap and presumed redundancy of information which prompts studies such as the NFAIS abstracting and indexing overlap study referred to earlier. My dealings, in particular, with scientists and engineers in industrial settings as part of my consulting assignments, yield a highly cautious reaction to the suggested implementation of SDI profiles. Their thoughts immediately turn to stacks of unread journals, and then fear that these stacks will ultimately topple over and bury them. They don't want the material, they want to know if it is germane to the solution of their present problem. I find these users generally dissatisfied with the tried and true library technique of routing journals. They arrive at inconvenient times, they contain much information of no interest, and yet there is a sense of guilt, at least among some, about holding up the journal from further distribution. And so many of them cross their names off the list and pass it on, pretending they have read it.

The designers of our abstracting-indexing services, data bases, and major information systems insist on and perpetuate the myth that their output is going to be used directly by technical professionals. I teach a course in the literature of science and technology at the Indiana University Graduate Library School, and my students learn quickly enough that with some significant exceptions such as *Chemical Abstracts*, the AI and data-base services pay not the slightest attention to the real needs of the real users of these information tools. Most of them, particularly those produced by professional societies, but also certainly including government services, are self-perpetuating clubs which pay little attention to the needs and preferences of the real users, in part because it is an embarrassment to acknowledge them.

An embarrassment? Certainly politically so. I served for five years as Executive Director of the contract-operated NASA Scientific and Technical Facility. During that time the agency persisted, in its program-design strategies and financial justifications, in describing the users of its information services as scientists and engineers, when we knew that virtually all of the document requests, and most of the machine searches, were performed for and by librarians and other information workers. The reason for this stratagem was perfectly obvious. Funds are far easier to justify and obtain for the support of front-line bench researchers than for the support of libraries.

When the National Library of Medicine first designed its on-line MEDLARS system, it was with rosy justifications about men and women in white lab coats sitting at terminals, and perhaps rushing back to the laboratory or even the operating room, if you care to be melodramatic, to use the results of their information searches for instantly successful application. It never happened. The people at those terminals are librarians. A number of projects, including MIT's Project INTREX, were aimed at the implementation of the premise that information systems should be geared to the common denominator of the interests and capabilities of the untrained scientist and researcher. A number of other research projects at various universities are aiming at this same premise, at making information access systems fit the level of competence of the ultimate user. It would be a harmless exercise, except for the fact that by reducing file structures and access software to a common denominator, we back away from the optimum capability which sophisticated file design and search strategies for uniquely structured data bases frequently offer us.

The premise is, as I suggest, based on a myth—the myth that the ultimate users of information enjoy the process of search and discovery in the literature, and that they would prefer to do this themselves, given the option. It is more likely that they do it, when they do it, because they don't trust anyone to do it for them, or because somebody has told them they *should* do it themselves. Furthermore, they do it badly—I'll come to that later.

Perhaps except for those involved in basic research (and even there only perhaps) individuals need information not for its own sake, but for the purpose of doing something else—of making a decision, of writing a report, of choosing an experimental alternative. They usually want and need the information quickly, simply, and with as little work on their part as possible. Mooer's Law, that if it is easier to make assumptions and guesses than to dig for information you know is there somewhere, people will pretend there is no information and make assumptions and guesses, has been demonstrated over and over again to every information professional. Furthermore, most professionals fail to see the information-gathering and evaluation process as one of particularly high gratification and reward. As George Shapiro[6] of the University of Minnesota has pointed out, they identify with the library in terms of their own childhood, when they felt somewhat overawed and overwhelmed by the power structure which confronted them and the rules with which they had to comply. Now they have achieved power, prestige, and a salary at least twice that of the people who work in the library. They are certainly not going to reveal to these people that there are tools they don't know how to use. So they stay away entirely and pretend they don't need information, or they send their secretaries.

I started this talk by pointing to the growth of service functions, and of the acceptance of delegating work to specialists, while at the same time feeling superior because, after all, these people work for us. One of the symbols of power is the ability to delegate work to others, particularly work we don't want to do ourselves.

About eight years ago a major corporation developed what was one of the earliest on-line interactive management-information systems. They placed a keyboard and cathode ray display into the office of every senior executive, with the promise that by using these terminals they could get instant reporting and updating on such important considerations as production status, unfilled orders, inventory, and cash flow. The system worked perfectly, but the executives wouldn't use it. They wouldn't use it because they perceived, and still perceive, sitting at a keyboard as a clerical function and having to ask and interpret their own questions as lowering of status. And so these executives were provided with information intermediaries, and the terminals were given to these staff assistants sitting in outer offices. These intermediaries would perform the searches and provide the information, either after being asked, or on an automatic updated basis. The executives went back to their comfortable methods of information access befitting their status—receiving digested reports and analyses, summoning people to their office for oral briefings, and using the telephone.

Users' evaluation of their needs

However, in addition to dealing with the myth that information systems should be designed for direct access by the ultimate user, despite the fact that he neither uses them nor cares to use them, and despite the risk that fitting the system to his level of understanding and training may dilute and downgrade information access, we deal with an additional myth. That is the myth that professionals know the literature of their field, and can make evaluative judgments about that literature—at least to do it better than librarians and information officers.

I was surprised when I came to an academic community after twenty-five years in government and industry, at the extent to which academic libraries have conceded the selection process to their faculties. During times of affluence, when the real test of a high quality library was its ability to identify and locate obscure materials, library bibliographic specialists and acquisition officers had a prized and valued role. However, now that the number of easily identifiable acquisitions far outnumber the available funds, many librarians have reported, paradoxical as it may seem, that decision and evaluation procedures within the library have all but disappeared. Instead, we are engaged in a tortuous and highly political process of buying or renewing what we must, frequently involving the allocation by formula of materials budgets to various departments and schools, a process which guarantees that whatever imbalance and inequities now exist within the collection will be perpetuated and exacerbated. In fact, many of these highly prized libraries have disintegrated into little more than free book stores for the acquisition of materials for storage in faculty offices. I am not suggesting that the same practice does not also exist in many industrial or governmental libraries. It undoubtedly does, but perhaps not to the same extent.

I would be the last person to suggest that libraries and information centres be operated without paying attention to the needs of their users, but there is, I think, considerable danger in running them simply in response to the priorities and desires which users express, and the needs as users perceive them. To suggest that we may have more valid perceptions about their information than our users is, for the information sector, a radical new thought, but it is totally consistent with the acceptance of service specializations developing in other fields.

What can we say about information operations run to the specifications of their user communities? Well, for one, that expectations of information service are abysmally low. It might be expected that, by contrast, expectations for materials collection might be high, and this is generally true, but only for the very narrow and specialized area of the user's own competence, and not for the collection as a whole. Our users don't really care about the quality of the library, only about the quality of their part of it.

Almost without exception, in my experience, the determination that an information service was poor and needed substantial improvement came either from its own staff, or from a higher level of management, and never from complaints from its users. Expectations for analytical and evaluative services are almost non-existent, and this appears to be true even when this service could be provided by individuals whom the user might accept as fellow-professionals and practitioners in his own field. Certainly the concept of information analysis centres, so fervently put forward by Alvin Weinberg[7] twenty years ago, has never really taken hold. In fact, the last several years have seen the demise of a number of information analysis centres, ostensibly because of budgetary pressures, but in reality because of a lack of interest. There is always money for things which people really want done.

My own experience in dealing with, in particular, scientists and engineers, points to their strong insistence on the development of a materials collection, but a materials collection based on tradition and experience rather than on newly evolving needs. The self-perpetuating and self-validating 'invisible college' system is simply not geared to an awareness of newly evolving publication sources and publication formats, particularly when these require access to information in related or even unrelated disciplines in which the user has neither experience or training. This is not intended as a criticism. I believe that the fact that professionals in various disciplines can no longer keep up (if in fact they ever did) with needed information in their fields is neither surprising nor disturbing. They have other, perhaps more important things to do. What I think is disturbing is that we, as information professionals, expect them to keep up themselves, or allow them to pretend that they do.

User evaluations of their information needs tend not only to be narrow in scope, but also conservative. Known things will invariably outrank unknown things, One of the most disturbing findings of our NSF-sponsored study,[8] to me, although many others hardly noticed, was the pattern of decision priorities which emerged when large academic libraries no longer had enough money to maintain their historic practices of journal acquisition—namely to renew everything already bought and subscribe to everything newly published.

Forced to make reductions in their periodicals subscriptions, these libraries failed to renew some existing subscriptions, to be sure. However, to a far greater extent, their budget-trimming took the form of not subscribing to newly published titles. In fact, when compared to their pre-economy 1969 patterns of activity, the strategic choice of failing to purchase a new subscription which would otherwise have been bought was exercised seven times as frequently as the option of cancelling an existing single subscription, and this, of course, in the face of the evidence from the University of Pittsburgh[9] study that huge chunks of the periodical literature, perhaps half or more, is never looked at over a five-year period in a major academic library.

Librarians, of course, must bear their share for this non-evaluative value system under which existing titles, no matter how useless, take precedence over new ones. Some of these are bound to have at least some potential, particularly in view of the recognition that many emerging disciplines are covered only by new publications and not at all by old stand-bys. Certainly, the library workload system would be geared to renewing the existing subscription and forgoing the new title. This requires no additional work in the Serials Department, rather than cancelling an existing subscription and placing a new one, which involves double work. However, the complicity in this process of our subject specialist users, and in many cases their outright insistence on this value system, calls sharply into question the assumption that professionals in various subject areas are indeed the best qualified monitors of their own literature. On an after-the-fact basis, of literature they have once seen, without a doubt. But how can they judge the usefulness of information about the existence of which they know nothing, when in fact they believe they already see everything of importance to them? It is an absurd assertion, but nobody has ever challenged it. And so we have individuals working on similar projects, some the beneficiaries of large sophisticated information services, others dependent on the routing of twenty journals by the departmental secretary. And yet each insists that his information system is adequate. He must; how can he admit the contrary?

Conclusion

Addressing myself finally and circuitously to the topic assigned to me in the program—the user's view: hopes and expectations, the effects on the user and his operation—we must first address the question of who this user is.

If, by user, we are talking about the ultimate recipient of information service, be he or she bench chemist, economist, or business executive, then I doubt that hopes and expectations have very much to do with the case. These individuals have for a long time suffered from a severe case of information oversupply, and they have rationalized what they find time to do as being adequate to their needs. After all, they are not paid to digest information, they are paid to do productive work. They have no choice, and if necessary they will lie to themselves and to others, or perhaps even train themselves to believe, when they assert that they have all of the information they need—or that they would have all of the information they needed if only we would provide them with these five journals which contain everything they need to know.

The development of new abstracting and indexing services, progressively narrower, more specialized and therefore less self-sufficient, and of new machine-readable data bases with unique and complex search strategies and differing vocabularies or free text search, does nothing for these individuals except increase their anxiety. They don't need more information services. They already have more than they can possibly cope with. They want, if anything, less information, but they need answers to their problems.

If, on the other hand, the user is an information professional, trained and expert in the knowledge of data bases and search strategies, then not only do I see a meaningful utilization of the world's growing literature and the tools with which to access it, but also a promising future for those who now labour in this vineyard, unappreciated and underpaid. Not all of them, by a long shot. But enough of them, and enough of the new recruits attracted by the challenge and opportunity, to fill the ranks. However, to do this they must understand nomenclature, technology, and the problems confronting the organization they serve. More importantly, they must understand that the need is not for reports and journal articles, but for answers. I am, of course, talking about the concept of the information intermediary, and I am talking about a conscious and planned approach to remove the user from primary contact with the literature, not to bring him closer to it. He's never been that enamoured of it in the first place.

However, old value systems and old prejudices die hard, and the implementation and acceptance of this professional intermediary concept will not be sudden or automatic. It requires, first of all, a belief by ourselves in our own role and our own importance. It requires an assertion and insistence that in fact the ultimate user professional really knows damn little about the literature of his field, that he knows less and less all the time, and that the problems of solving his information needs are beyond his scope. Or, if it seems preferable, that he has more important things to do than worry about books, journals and reports. Acceptance of the need to rely on specialists is, after all, not that strange. We do it to an increasing extent in all other areas of our daily activities.

It requires, additionally, a shift from the preoccupation with materials to a concentration on answers. It is, if you like, Weinberg's information analysis centre in new clothing, but with new participants. Scientists selected for information work were frequently handed these tasks because they were considered unsuited for what was believe to be 'more important' work. I foresee the information function as demanding and exacting, and its practitioners as meeting those requirements. The question to be addressed is: what is the need? Don't ask the ultimate user what he would like you to look at or where he thinks the answer might be found. Fine if he volunteers suggestions, but don't simply assume that he knows, or embarrass him if he doesn't know, or force him to pretend he knows.

Finally, it requires an understanding by abstracting-service and data-base producers for whom their services are being produced, and some input by the real users regarding those services. In an increasingly interdisciplinary world it is foolish to insist that information services in a subject field are produced specifically and directly for the practitioners in that subject field. If these information-service producers recognize their audience, then perhaps, and only then, can we achieve some consistency of approach, arrangement, vocabulary, and format. But only where this can be accomplished without dilution. Common denominators tend to be small numbers.

What I am suggesting has, of course, major implications for the philosophy of the present self-service library. There are fields in which self-service will continue, either because the field is truly narrow, clearly defined, and highly specialized, or because research investigations are carried out, as they sometimes are in the humanities, over a lifetime and not in preparation for tomorrow's meeting. These, however, also tend to be the fields in which information tools are sparse or primitive.

In applied science and technology, business and industry, and government, however, the need is not for more sources of information for the ultimate consumer to scan—the need is for answers. If any of you doubt this, look at the recent development of commercial organizations whose sole purpose is to analyze and digest information contained in our libraries and information centres, and to apply it to problem-solving—or at least, to synthesize, boil down, and comment on in terse, directly applicable statements. It is this need which the growing group of on-demand information services has recognized and addressed, because we have either failed to recognize the concern or refused to involve ourselves in it.

The capabilities of computer technology, and the funding support of concerned governments and industries, have allowed us to make remarkably rapid progress in the development of tools in many fields for coming to grips with the problems of expanding literature, expanding inter-dependency, expanding specialization, and increasing time constraints. At present our tools, which will most certainly continue to develop as pressure increases and technology improves, already outstrip our abilities ot use them because of an insistence that somehow they must be geared to the ultimate user's interests, abilities, and available time.

Optimum simplification consistent with or in conjunction with the maintenance of other values is always a worthwhile goal, but simplification as an end in itself in a desperate rearguard attempt to make the system fit the wrong user is not the right answer.

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DISCUSSION

SESSION 3

MR A. E. CAWKELL (ISI) quoted from the 1974 Labour Manifesto 'Labour will replace the Official Secrets Act by a measure to put the burden on public authorities to justify withholding information' and said it seemed the most welcome change from the present 'government's right to withhold' towards a future 'public's right to know'. But after twenty months of deliberation the July 19th White Paper specified three areas of information flow to be exempt from criminal proceedings (under section 2 of the 1911 Official Secrets Act proceedings may be taken for any kind of disclosure). This did not indicate a move towards a Freedom of Information Act as proposed in the manifesto. On the contrary, the proposed specificity for part 2 might prompt action not otherwise contemplated in the present Act, since something definite to bite on was provided. At present the self-evident absurdity of part 2 had resulted in rather rare applications of it; in the extraordinary Biafra trial the judge suggested that the Act be erased from the statute book.

He thought the White Paper most unsatisfactory in view of events elsewhere. In the US, the Freedom of Information Act had been in force for some time and, whilst a number of problems had arisen, surely the 'right to know' intent was overwhelmingly better than the UK's implicit 'right to withhold'? For example, a person could demand access to a US government record about himself and have it changed if it contained errors. How could further delay in a Freedom of Information Act be justified in this country?

MR BUCHANAN's own opinion was that anything was revealable unless positively prohibited. Politics being the art of the possible, Government had to look at what they could get through without a majority. A wider ranging enquiry was promised and progress was being made gradually. Allen had studied the (US) Freedom of Information Act and was not keen on it. The White Paper was the first attempt at a compromise and if a Labour Government was returned an improved Act would follow.

MRS E. MARSH (Rutherford Laboratory) mentioned the instinct for secrecy in the Civil Service.

MR BUCHANAN thought that the White paper went most of the way to abolishing this secrecy. He himself had achieved more for his constituency via contact with the Civil Service than by tackling problems head-on with maximum publicity.

MRS GRETCHEN TAYLOR (Offshore Information Literature) mentioned DOE secrecy about offshore accidents.

MR BUCHANAN thought this illustrated the absurdity of the Act as indicated in the Fulton Report and this was being resolved.

DR D. A. LEWIS (ICI) asked whether the House of Commons were making better decisions with more/better information available to them. He also wondered whether Mr Buchanan was aware of the dissatisfaction of the information community with the standards of service of HMSO?

MR BUCHANAN thought that on the whole better decisions were being made. He quoted 'From each according to his ability, to each according to his needs'. While the second part had largely been solved, the first part was the secret of Britain's success and still needed improvement. MP's did not lack advice, but sometimes information was wrongly given. He was not aware of the HMSO problem, since MP's got the papers necessary to conduct their parliamentary business. The question of introducing computer typesetting had held up production of House of Commons indexes, as had the proposed move to new premises.

MRS GEORGIA H. RODEFFER (North Carolina State University) commented that in view of the statistics and charts presented by both Dr Appleyard and Professor White which illustrated that Europe was four years behind the US in on-line services, it was interesting to note that the only two on-line textile data bases in the US were produced in Europe, *i.e. World Textile Abstracts* produced by the Shirley Institute in Manchester and TITUS developed by the Institut Textile de France.

MISS STELLA KEENAN (Loughborough University, Department of Library and Information Studies) had two comments and a question in connection with Professor White's paper. In connection with education programmes and data base producers a recent survey of training programmes conducted for EURONET showed that the advent of machine-readable services and, more especially, on-line services, had caused data base producers to become increasingly involved in education and training programmes covering not only the machine-readable but also the printed form of their publications. Her second comment related to the NFAIS overlap study mentioned by Professor White in his paper. He was quite correct in detecting a note of 'defensiveness' in the report. The member services of the Federation undertook the study only after a very clear indication from the National Science Foundation that if they did not conduct the study themselves, an outside organization would be involved. Rather than be subject to yet another ill-conceived and badly designed study, Federation members undertook the survey but with some concern that, if significant overlap was found and the NSF of the day felt overlap to be a 'bad thing', services might be requested or even directed to reduce such seeming redundancy. This led to a question on EURONET for there was concern that European users might suffer from government edict and be barred from US services that were performing effectively at the present time. Surely what was expected from EURONET was a comparable or better service at the cost of existing systems or less.

PROF. WHITE regarded the assumption that overlap is bad—one place for everything—as inconsistent with the search process. How did one work out how people were going to use the service?

DR APPLEYARD felt there was little fear of information by edict. There was slight moral risk if the European Post Office had a policy of differential rates and a slow problem of differentiation of access by differentiation of subsidy.

MR H. R. COLLIER (ISI) was interested in Dr Appleyard's search for 'entrepreneurs' in the context of the shortage of European databases in the field of economic and commercial information. One reason for this was that many small US companies had grown up on government contracts. All too often, government contracts in Europe went to government bodies or 'the establishment', as in the case of the data base contracts placed with Atomic Energy Authority in Harwell (nuclear information) and the National Coal Board (energy).

DR APPLEYARD said that government money for R and D usually went to the large organizations because they 'understood the government machine', but this was a question for Brussels to investigate.

MISS ELEANOR HAYDOCK (B. C. Hydro and Power Authority) asked whether any attempt had been made to evaluate the usefulness of the information produced from the millions of computer searches carried out in the US during the last few years.

PROF. WHITE replied that this was difficult to evaluate since there was no model with which to compare. The only model is to have a group with no information. Also, users do not always notify information staff when their job, and therefore their profile, changes.

MISS E. MCNAMARA (Trinity College) raised the question of subject specialists in university libraries.

PROF. WHITE agreed that academics may only accept subject specialists' and will not accept librarians' judgments as such. This is a shame, because subject specialists do not always know the library system as well as they think they do—'every one considers himself an expert on libraries'. Why should the head of the laboratory sit on the library committee if the librarian cannot tell him how to run his lab? We have to make the point that we have expertise others do not.

MISS FRANCES TAIT (BBC) raised the point that as subject specialists we should not confine ourselves to the literature but should go to press conferences, meetings, forests, oil rigs, etc., and collect information that the users do not get the opportunity to hear/see.

DR DENNIS SHAW (Oxford University, Radcliffe Science Library) suggested that we should try to develop more effective methods for marketing the services we have to offer—particularly in the academic environment. On the one hand we must create the currency with which the services may be purchased and on the other hand advertise these wares and match the product to the user's needs.

The concept of a national organization for information: the British Library, achievements and potential

Sir Harry Hookway

Chief Executive, British Library

Paper presented at the 52nd Aslib Annual Conference, Edinburgh, 19th–22nd September 1978

Introduction

RATHER THAN making an exhaustive survey of the Library's progress since 1973, I have selected a few areas that seem to me to be important in illustrating the British Library's work. The title of my paper is *The concept of a national organization for information: the British Library, achievements and potential* and in order to understand the Library it is necessary to know something of the background and the pressures which led to this institution being set up.

As members of this Conference are all too well aware, information has played an important role in human affairs throughout the history of mankind, because information can lead to those reasoned judgments usually categorized as knowledge; and from knowledge, on occasion, can come wisdom. As Lord Tennyson expressed it in Locksley Hall—'Knowledge comes but wisdom lingers'.

What distinguishes modern society from its predecessors is the extraordinary diverse, complex and interactive nature of its information needs. It follows that these needs must result in great and increasingly severe demands on whatever infrastructure of library and information services may be in existence to service them. The twentieth century has seen the growth in the United Kingdom of a large and efficient range of library services, public, academic and specialist to meet the needs of education, science and technology, industry and so forth. This growth, both rapid and haphazard, generated strong pressures for the creation of a range of centrally provided services which could supplement and extend those of the other library services. The growth of the institutions designed to provide the central services was also rapid and haphazard, and by 1968 it had become apparent that the arrangements were confused and wasteful and were hindering the development of a more effective infrastructure better suited to the needs, both cultural and economic, of the UK. The Government of the day therefore set up a National Libraries Committee to consider whether in the interests of efficiency and economy the major institutions providing central services should be brought into a unified framework.

The central institutions principally concerned were the British Museum Library, including the National Reference Library of Science and Invention, the National

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Central Library, the National Lending Library for Science and Technology, the British National Bibliography and the Office for Scientific and Technical Information. The enquiry did not embrace the National Libraries of Scotland and Wales because these libraries provided—and still provide—distinctive services principally directed towards meeting the special requirements of Scotland and Wales.

The National Libraries Committee reported in 1969. Its principal recommendation was that the administration of these institutions under review should become the responsibility of a new statutory and independent public body. The Government accepted the main thrust of the Committee's recommendations and, having consulted the governing bodies of the institutions concerned, announced that the five institutions would be transferred to a new organization to be known as the British Library. Legislation followed, and in April 1973 the Board of Management for the new organization was set up, followed by the progressive transfer of staff, functions and collections to form the British Library from July of that year onward, the process being completed in August 1974.

In taking the decision to set up the new organization, the Government had argued that effective articulation of the functions exercised hitherto by the five separate institutions would have a profound influence on the future efficiency of the United Kingdom's library structure, and concluded that central planning and management, so that unnecessary duplication could be avoided, new techniques more effectively employed and resources better allocated, and the full benefits of working on a United Kingdom scale would only be achieved if the institutions concerned were brought together in one organization, centrally financed and directed.

The British Library has now been in existence for just over four years. Have its achievements matched the Government's expectations, and what does the future hold for this great institution? Before looking at its achievements and future prospects it is advisable to look rather more closely at the immediate consequences of the Government legislation since this sets the framework within which the British Library has to operate.

Functions and responsibilities

The functions and responsibilities of the Library and the Board are laid down in paragraphs 1–3 of Section I of the British Library Act. These paragraphs run as follows:

> 'This Act shall have effect with a view to the establishment for the United Kingdom of a national library, to be known as 'The British Library', consisting of a comprehensive collection of books, manuscripts, periodicals, films, and other recorded matter, whether printed or otherwise.
>
> The British Library shall be under the control and management of a public authority, to be known as 'The British Library Board', whose duty it shall be to manage the library as a centre for reference, study, and bibliographical and other information services, in relation both to scientific and technological matters and to the humanities.
>
> The Board shall make the services of The British Library available in particular to institutions of education and learning, other libraries, and industry; and (a) it shall be within the functions of the Board, so far as they think expedient for achieving the objects of this Act

> and generally for contributing to the efficient management of other libraries and information services, to carry out and sponsor research; (b) the Board may contribute to the expenses of library authorities within the meaning of the Public Libraries and Museums Act 1964, or of any other person providing library facilities whether for members of the public or otherwise.'

It will be apparent that the responsibilities of the British Library are unusually wide and comprehensive, with an emphasis on provision of services, and that from the start it has been designed to serve the United Kingdom as a whole. The Library is the principal depository for British Copyright publications, producer of the British National Bibliography, the central library institution for loans, a major developer and operator of computer-based bibliographic and other information services, and the main source of support for research in library and information science. It will also be noted that the British Library Act provides explicitly for the Library to give financial assistance to other libraries. For administrative purposes it is organized in three divisions—reference, lending and bibliographic services, together with a Research and Development Department and a Central Administration. A noteworthy point is that the three operational divisions are regarded as equal in status and importance.

The way ahead

The British Library Board was faced with the difficult and complex task of bringing together in one institution the staffs and functions of five very different organizations during a period of increasing economic uncertainty, inflation and retrenchment. Despite these problems, the Board adopted an outward-looking policy of striving to develop and strengthen a range of central reference, bibliographic, lending and research support services in such a way that public, university, polytechnic, industrial, specialist and other libraries could make better use of their own resources in directions of particular interest to themselves and their users.

Consultation

Since these central services could have a profound effect on all parts of the library system they have been developed in consultation with the principal user and institutional interests. Soon after the creation of the Library, the Board set up extensive advisory machinery to help ensure that performance and planning were responsive to the needs of users. An Advisory Council was set up to advise on the British Library's relations with other libraries, with its membership drawn mainly from nominees of the major institutions and organizations, including Aslib, representing the wide range of users served by the Library. Advisory Committees were also set up to provide the expert advice and assistance needed for the Library's operations. In all, five such committees have been established to advise the Lending Division, Bibliographic Services Division, Reference Division (Bloomsbury), Science Reference Library, and the Research and Development Department. Well over 100 individuals have willingly given their time to this important work, and their assistance has done much to ensure the fruitful development of the British Library.

Services

Now a word about some of the services provided by the Library. The reference facilities are being planned so as to provide all the essential central reference services around which other libraries can build up with confidence their own collections and services for the future. In this the Library has been fortunate in having inherited, mainly from the British Museum, by far the greatest single collection of material printed in the English language together with an exceptionally extensive and well-balanced collection of works in all foreign languages. This great general collection is unexcelled in Britain, and because of its breadth of coverage it serves to supplement the resources of other reference libraries and expand the horizons of those who use its facilities. The major constraint on the development of these services has been, and will continue to be for the next decade or so, the need to operate within outmoded, overcrowded and inadequate buildings. The Government's recently announced decision to make a start on a new building designed to house all the British Library operations, at present scattered over 17 buildings in Central London, is therefore particularly welcome. It opens up the way to solving many of the intractable problems of the Reference Division, which is one of the largest libraries in the world; and it also provides incentive for solution of many shorter term problems incidental to development and for improving services under very difficult conditions.

As many of you will know, the Reference Division of the Library consists of the Departments of Printed Books, Manuscripts, Oriental Manuscripts and Printed Books, together with the Science Reference Library. It is the vast collections of the Department of Printed Books which now and for the next decade present the main problems in providing a good service to readers, since until completion of the first phase of the new building an increasing number of books will have to be placed in remote storage. Great efforts are being made to ensure that the categories of books in lowest demand are selected for outhousing. Already, rationalization of the storage and the arrangements for delivery of books within the main building in Bloomsbury has resulted in substantial improvements in the quality of the service offered. Now some 66 per cent of all requests for books stored in Bloomsbury are met within an hour, compared with 42 per cent in the previous year and much lower figures for many years before. Set against some 600,000 requests a year, the service would appear to be noticeably improved, especially when the satisfaction rate of requests for books and other items on first demand is taken into account. The gross failure rate is around 8 per cent, but after allowing for requests for books already in use by other readers (the largest category), shelf mark queries and the small percentage of books requested that were destroyed during the Second World War and have not yet been replaced, the failure rate is reduced to 2 per cent, which would be difficult to improve.

Aside from these marked improvements in book supply for those who actually visit the Bloomsbury site, important developments are under way which will have a profound effect on the use made of the collection. The first major step in this direction was the inauguration, in late 1975, in collaboration with the Bibliographic Services Division, of a new series of catalogues based on the Anglo-American Cataloguing Rules (AACR) and MARC for the author/title catalogues and the PRECIS system for the subject catalogues. These catalogues replace the British Museum General Catalogue and Subject Index in respect of material published from 1975. To begin with, the main use of the system has been as a means of access to the library's collections on site. Increasingly, however, the library community and the public will benefit from the possibilities for quick and easy distribution of up-to-date bibliographic information and information about the holdings of the library, either by computer output on microfilm or by on-line access to the British Library's data base. If, as is expected, other large libraries adopt the same standards as the British Library for input to a common data base, a whole range of new possibilities for resource exploitation would be opened up.

Turning now to the Science Reference Library, in contrast to the Department of Printed Books, where the majority of readers are of academic origin, the most numerous readers of the Science Reference Library are either members of industrial companies or agencies or other services who themselves work for an industrial clientele. Nevertheless, use by academic institutions is on the increase and efforts are being made to encourage this trend. Here too, there are great problems caused by inadequate accommodation resulting in the collection being split among no less than five locations. Since 1973 the library has had as its prime objectives acquiring and making rapidly available to users worthwhile scientific and technological literature of the world, including the patents issued by the leading industrial nations. A significant achievement has been the development of the Science Reference Library Computer Search Service. Access to thirty-eight different data bases through British, American and European service suppliers is now possible. This service, coupled with the wide ranging collections of scientific and technological material and the outstanding patent collection is ensuring that British industry has a first-rate service at its disposal. At a different level, the Science Reference Library, in common with the other parts of the Reference Division, issues a wide range of guides to the collections, special publications and pamphlets designed to assist its users.

Inter-library loan

Perhaps the most striking and best known of the services offered to other libraries are those provided by the Lending Division. When it was created from the former National Central Library and the National Lending Library for Science and Technology, it provided for the first time anywhere in the world a comprehensive central loan and photocopy service covering all subjects, all languages, and most categories of material. As a result, interlibrary lending demand has focused on the Lending Division which now handles three-quarters of all interlibrary loans in the United Kingdom. Even now, demand continues to increase, although at a lower rate than in earlier years. At present 2,645,000 requests a year are received. The overall satisfaction rate from stock is around 83 per cent, and with the assistance of other libraries, this rises to nearly 95 per cent.

A noteworthy development has been the arrangements made with the legal deposit libraries and certain other major libraries and special libraries to provide back-up facilities. These arrangements have greatly extended the availability of material held in the United Kingdom and all told, these libraries now receive about 117,000 requests a year. One benefit of the unitary structure of the British Library has been the substantial help given by the Reference Division by way of photocopying and verification of difficult requests. About 40,000 photocopy requests a year are now sent to the Reference Division.

There is no doubt that the Lending Division is now recognized as the main source of serials, report literature, conference proceedings, official publications and foreign-language monographs. The majority of its users are from universities, commerce, industry and government. The regional systems which mainly serve public libraries continue to be the principal source for fiction, lower-level English language monographs, play sets and sets of orchestral and vocal scores. The major area of overlap—recent English language monographs—is recognized as necessary because the heavy demand for some titles makes two sources of supply desirable.

At present most requests are received either on prepaid photocopy/loan forms or by Telex. A major new development will be available shortly in collaboration with the Bibliographic Services Division, when the BLAISE Automatic Document Request Service becomes operational. Libraries will then be able to check requests on-line against the British Library's data bases and transmit them direct to the Lending Division via the BLAISE computer.

Bibliographic services

At the heart of the British Library's bibliographic services is the Bibliographic Services Division. It was established with the objective of providing centralized cataloguing and other bibliographic services related to the needs of the national library and the library and information community. Its basic approach has been to seek to integrate the internal processing operations of the Library with external services to other libraries so that its cataloguing, classification and indexing activities create records which can be used for any required purpose. To this end, a major step forward has been agreement within the British Library to use AACR and MARC together with PRECIS as standard throughout the Library.

All the Division's operations are now computer based and form part of an extensive range of services offered under the name BLAISE (British Library Automated Information Service). Four main types of service are supplied:

(i) an on-line facility,
(ii) complete tape services,
(iii) selective record service,
(iv) local catalogue services.

The first three are essentially designed for those libraries which have established their own computer-based operations and are using the central system as a source of data. For libraries not having or wishing to use a computer the local catalogue service provides catalogues on microfilm or microfiche tailored to local requirements.

The BLAISE on-line services began in April 1977 with information retrieval from the MEDLARS data bases. In October of that year the MARC (Machine Readable Catalogue) files representing the cumulated cataloguing of the British

National Bibliography since 1950 and the Library of Congress since 1968 were added to the system, and plans are well advanced for adding other files from within and outside the British Library. The most important initially will be the machine-readable catalogue records of the Reference Division which will extend substantially the coverage of the UK MARC files.

An on-line shared cataloguing facility is available on an experimental basis and should soon become fully operational. This enables users to select catalogue records at the terminal and to edit them for local use. Users can also create new records which can, if suitable, be incorporated in the main data base for other subscribers to use. The number of subscribers to the on-line facility is 335 and continues to increase at about twenty a month. Already, the service is among the largest and most intensively used outside the United States.

A most important product of the Division has always been the British National Bibliography whose output is based on the material deposited under the terms of the Copyright Act. The timeliness of entries for current British publications in the National Bibliography and, therefore, in the computer data base is always a matter of concern, and strenuous efforts are being made to ensure the highest level of currency and coverage not only by maintaining highly qualified teams of cataloguers and indexers within the Division, but also by encouraging the fullest co-operation of publishers in depositing titles on or before publication and participating in the Cataloguing in Publication programme. Despite problems—now solved—over maintaining an acceptable degree of currency in 1977, the number of entries amounted to 34,348. This year the figure is likely to be in the region of 40,000.

Research and development

All that has been said so far related to operational services provided directly by the Library, but the Research and Development Department's resources are employed to support work designed to assist users, processors and disseminators of information to plan and develop their own operations with greater confidence and with a clearer understanding of the possibilities for co-operation at the national, regional and local level. For example, the readiness with which users have been prepared to adopt the BLAISE Service is due in no small measure to the library automation research projects supported by the British Library, which have built up expertise, demonstrated operational systems, provided economic assessments and furthered a cost-conscious approach to automation. Resources are being devoted to key areas such as how reference material is used, users' needs and user education, primary communications, and experimental information systems in special fields such as education and community services and use of telecommunications for communicating information.

In all these areas much of positive benefit has emerged, but two main problems have to be set against these achievements. The first is the failure of information science to emerge as a discipline through basic research, and the second is the problem of maintaining a good flow of unsolicited research projects in all significant fields of applied and basic research.

Apart from the work of the Advisory Committee for the Research and Development Department, much assistance is also given by special review committees set up to investigate information needs and supply in various fields, and, not least, by the many referees of research and development projects whose advice is invaluable in helping the Department to allocate its resources wisely.

Assistance to other libraries

Mention has been made earlier of the provision in the British Library Act which enables the Board to contribute to the expenses of persons providing library facilities. The Board's resources for this kind of support have been limited, and have been directed, therefore, to improving access to collections of national significance, where an alternative source of funding is not available. Since 1974 grants totalling £280,000 have been made to seventy-one libraries in the United Kingdom to assist cataloguing, conservation and other related activities.

Future prospects

In an overview of this kind it has been impossible to deal with other than a few major aspects of the complex and wide-ranging activities of the British Library, but despite the highly selective nature of this paper it is hoped that enough has been said to show that the services offered by the British Library are both relevant and useful to the community of library and information services in the United Kingdom. The service to the United Kingdom—an international service in microcosm—has been stressed although the British Library has, and will continue to have, a vitally important broader international role in promoting standards for bibliographic exchange, providing an overseas photocopy and loan service throughout the world and in many other ways.

What of the future? It is always tempting to dismiss the immediate future with a certain degree of pessimism and to look to the more distant prospects with euphoria. On the whole, it would seem that the prospects for the British Library, both short and long term, are reasonably encouraging.

A first priority is for the Library to build closer relationships with those principally interested in its main activities, and to extend and improve its consultative procedures. For example, during the next five years many of the main elements in the Library's internal automation programme will become available—serials and monograph ordering and accessioning and direct on-line cataloguing of most of the material acquired for the Library. These developments will permit much greater sharing of information about stock, orders and acquisitions both within the British Library and, of equal importance, with other libraries seeking to relate their own acquisitions and holdings to those of the British Library. It will be important for the Library to ensure that its intentions in these areas are fully understood. The development of BLAISE and the role of the British Library and other library groupings in the growth of computer-based information networks will also require close co-operation and consultation.

Conclusion

During the conference much has been said about the changing nature of society and the profound role of technology in catalyzing these changes. That there will be changes is common ground, but their nature and extent is difficult to predict with any degree of confidence. It seems clear, however, that needs for information in all sectors will become greater rather than less and that life-long education and training will become an accepted feature of everyday life. In these circumstances it seems likely that demands on the library system as a whole, and on the British Library, are likely to increase rather than diminish. While technological developments may change the balance of services offered and increase the range of materials held by the British Library, it is unlikely that its fundamental role as a provider of essential central services will diminish.

The impact of the British Library on the national and international scene

Norman Higham

Librarian, University of Bristol

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Introduction

WHEN THE STANDING Conference of National and University Libraries was formed in 1951, its purpose was to bring together a group of libraries supporting research, especially in the academic field. All the libraries, whether national or university, were separate, independent bodies, autonomous in varying degrees. Twenty years later, Command Paper, Cmnd 4572, announced the intention of the Government to amalgamate certain of those libraries.

When the British Library, which arose out of that White Paper, became a member of SCONUL we were delighted that we were retaining links with our old members. But we became linked with something much more. For the new star which had 'swum into our ken' was something of a super nova. While, 'just like any average university library', it was providing reference, lending and information services, it was doing so on a vastly greater scale than any other member. And it was also the central service point for the inter-lending operations of the remaining members, and for all other libraries besides. Since that time, it has developed a bibliographical service that all other members use; and it provides research grants of which some of its fellow members make considerable and beneficial use.

Its effect on SCONUL may not in the whole scheme of things be a major example of the impact of the British Library; but I am happy to say that we notice its presence. Among our brother members the British Library is a very big brother indeed.

Under one policy-making body has been brought a massive resource—over ten million volumes of printed material alone—providing services to hundreds of thousands of users and lending or photocopying millions of items annually. The whole is greater than the sum of its parts. The effect of amalgamation into one unit has concentrated the vast resources, amassed enormous power and influence nationally, and attracted liberal financial support. It is a Leviathan among libraries. As the *Book of Job* has it, Chapter 41, verses 1–4:

> 'Canst thou draw out Leviathan with an hook? or his tongue with a cord which thou lettest down?
> Canst thou put an hook into his nose? or bore his jaw through with a thorn?
> Will he make many supplications unto thee? will he speak soft words unto thee?
> Will he make a covenant with thee? wilt thou take him for a servant for ever?'

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Seen in this light the British Library is a terrible creature, and we are at its mercy. By a change of policy, an increase in charges here, a switch of resources there, it can affect our own services powerfully. We may seek comfort from our knowledge of the inbuilt inertia and momentum of very large bodies, which accelerate and brake and turn only at slow speed. But even a flick of Leviathan's tail can rock the boat and may even capsize it.

How then is it to be kept under control and made to work for the common good? One essential is self-control, and we remind ourselves that those at the head of the monster are steeped in the tradition of a national service, and trust that they will train their staffs in this tradition. Another control is the 'will of Parliament' though this is a difficult instrument to handle. Yet another control, for those with ears to hear, is public, or in this case professional, opinion, which expresses itself in articles, in letters to the Directors-General, or to the Chief Executive, or even to the Chairman of the Board, and conferences such as this at which senior members of the Library are inevitably present and which provide a valuable opportunity for the exchange of ideas and opinions.

The mixture of self-control and professional opinion which the Library has created for itself is the formation of the British Library Board and of its Advisory Council and Committees. There is a real danger that meetings of the advisory bodies may lack contention and become a pleasant get-together of good friends, united only in membership of a privileged body. The solution to this problem is in the hands of the members themselves. If they are reporting back to the bodies they represent, they will ensure that they have played more than a passive role. The privilege that members of these advisory bodies enjoy is that of meeting and working with representatives of different organizations and in observing and learning from each other's attitudes towards the Library.

Unifying effect

There is a unifying effect of this collaboration at a personal level which may very well be reflected at an institutional level in the national scene. I hope I will not be understood to refer to a kind of 'Dunkirk spirit' in which disagreements are forgotten in the face of a common enemy; though I am sure that this conference will be unusual if the story of another misdemeanour of the British Library does not earn a drink at the bar. If not a common enemy, perhaps a common Aunt Sally has helped to forge friendships. But what I am suggesting is that the opportunities and the problems presented by a national library service uncover the objectives which libraries share, and encourage librarians and information workers to discuss them more frankly, and more frequently, than in the past. I merely suggest this since I cannot prove it. For there are a number of elements in our field of interest today which bring us closer together. We all suffer from a shortage of funds, and it is natural for us to discuss ways of combining to make the best of living at subsistence level. At the same time the developments in computerization, making possible operations which a few years ago would have required computer power unattainable to most libraries, have opened up discussions among different types of libraries to explore co-operative ventures. This is of course an area where the British Library is having a direct influence, both by its own activities in the computer field and by its financial support of research, but this is a theme to which I shall return later.

There are a number of factors today that prompt us to talk to each other more rather than staring at our own desk-tops. At varying levels of promise or problem are copyright, public lending right, on-line services, educational technology, the self-renewing library, unionization, the supply of and demand for librarians, AACR II, International Standard Bibliographic Descriptions, Universal Bibliographic Control and not a few others. And yet the interesting thing is that, while these happenings which tend to unite us are other than the British Library, the British Library is heavily involved with them all.

One of the impacts of the British Library therefore is that there is an inevitable logic about the way that every aspect of our working life is bound up in some way with its activities, and it with us. What the British Library does affects my university library and therefore my university, and what my library and other university libraries do affects the role of the British Library. And the same applies to all the institutions here represented, including those from overseas.

Services

Reference Division

It may be useful at this point to examine each Division of the Library in turn in the context of what I have said. The Reference Division contains arguably the greatest collection in the world. Its service to scholarship and scientific research is incalculable, and its use by visiting scholars bears testimony to its international importance. This was of course the case before the creation of the British Library, when the old British Museum and the National Reference Library for Science and Invention existed. How have things changed under new management? The developments in the Science Reference Library about which you have just heard are among the most significant. And I have been told that delays in obtaining books in the old British Museum Reading Room were reduced. Though I have had no occasion to test this, Sir Harry Hookway of the British Library has provided figures to prove it (p. 88–96). A change has surely come in the integration of this scholarly tradition into the overall policy of a wider service and the introduction of new techniques. The adoption of computer-based cataloguing preceded the British Museum's incorporation but it has been extended and intensified. The conversion of the General Catalogue of Books to machine-readable form is being actively considered, and its eighteenth-century holdings are being catalogued or recatalogued as Britain's contribution to a computer-based *Eighteenth-Century Short-Title Catalogue*, a contribution which is effectively taking the lead in this venture. Now that authority has been given for a start to be made on the new building at Somers Town, we (or our children) can look forward to the use of a combined reference library of humanities and science unrivalled in the world.

How far is the integration of the old and the new within the Division effective? In my experience there are scholars and scientists who are first-class administrators and there are scholars and scientists who, to put it kindly, are not good administrators. The latter are outstanding in a narrow field and they deserve their abilities to be given free rein in that field since their contribution will be essential. But the former have problem-solving skills which they are capable of applying to a variety of tasks, and they must be treasured, since the combination of administrative ability and scholarship is the most valuable asset which can be placed at the disposal of a learned library, especially one at the hub of the national library service. There is one considerable problem at the heart of the Reference Division's role with the Library. It has a duty to hold its stock ready for reference use by scholars who have travelled far to work there. At the same time a far greater number of research workers require material to be made available in their own institutions, for which a national lending system exists. Must the millions of volumes in the Reference Division remain always locked away in London waiting for their possible use by the comparatively few visitors? Can the Division contribute to a wider availability of material without damage to its reference service? The users of the British Library do not speak with one voice on this matter, but the British Library must adopt one policy. Its task is to maximize availability and this has had to involve new attitudes in the Reference Division. From outside, we cannot provide an answer; like good library users we simply tell it what we want however self-contradictory that may be.

Lending Division

The Lending Division is a very different branch of the Library. It was conceived many years ago within the field of scientific information. It was based on the need to place scientific articles in the hands of busy and impatient researchers as speedily as possible, and its staff had to develop the skills of good bibliographic warehousemen, and these are very considerable skills indeed.

The story of NLLST and BLLD is a success story; it has revolutionized the whole scene of access to scientific literature. It is interesting to observe that this is so despite the fact that the loans obtained from BLLD are a very small fraction of the loans recorded by, for example, the average university library. The answer lies in the values rather than the bulk of the material thus obtained. Scientific research in many institutions would be seriously affected if it were not possible to make use of the 47,000 serial titles available at BLLD.

And yet this Division is the subject of some of the most frequent complaints about the British Library. It is said from time to time that the service is getting slower or has got slower; that insufficient attention is given to all but the simplest applications; that loans to foreign libraries are increasing at the expense of the service to British libraries. Much of this criticism is subjective, some of it is simply incorrect. But there is enough of it to suggest that, alongside the recognition that it is essential to our work, there is the fear that it cannot indefinitely expand its service, that at some point will come diseconomies of scale. It would appear that a huge administrative problem will be involved in seeing this child of the fifties through the eighties. It must continue to be responsive to change even as the enormous demands on it increase. Already it is photocopying so much rather than lending that we are approaching a situation when we shall have two national science reference libraries, one in London and one in Boston Spa. How many can we afford?

The fact is that the Lending Division was set a severe problem when it took on the task of serving the humanities. The original clear-cut swathe through the undergrowth of scientific literature cannot be maintained through the jungle of material in the humanities. It was comparatively straightforward, by which I do not mean easy, to acquire the bulk of required scientific journals, bearing in mind the measurable life, half-life and death of material in this field. But the largest collections in the humanities are in the Reference Division and other learned libraries and have required, like the lawns at Hampton Court, centuries of careful tending to bring them to their present position. How can the Division keep reasonably abreast of the current output in the humanities? It must rely on the assistance of back-up libraries, and this must increase the delays involved. Even though these libraries receive payment for their contribution, this work forms only a part of the service which it is their duty to provide for their own users and it sometimes shows. It is a far cry from the conception of the twenty-four-hour turn-round of the old NLLST.

The picture is not so bleak as all that. We accept that research in the humanities involves a longer time-scale than that in the sciences, and we would expect scholars to wait longer for obscure monographs. On the other hand, librarians do not know as much as they should about the research habits of their academic colleagues especially in the humanities; they do not even know very much about their use of the library. This was borne out in the debate which has hummed around the Atkinson Report on capital provision for university libraries, and it has underlined the need for more investigations into the use of literature in the humanities. The Lending Division can assist these investigations on the basis of its information on the use of the material at Boston Spa and in the outlying libraries and the Reference Division can also contribute information in this important area.

The service which the Division gives to overseas libraries has earned it respect throughout the world. It is not uncommon to hear American librarians, for example, say that it is often quicker and safer to apply to Boston Spa for an item, even an American item, than to rely on their own interlending facilities. This state of affairs is a significant element in the high respect in which British librarianship is held in the world, and we should be thankful that we are able to provide uniquely in this area of library work. Since loans to libraries abroad are handled on a cost-recovery basis, as distinct from internal transactions, we are not supporting them; rather they are earning foreign currency. The only fear that British librarians may retain is that profitable loans to overseas libraries may become so attractive to Treasury inspectors that they are encouraged at the expense of local services. If this fear seems, not merely chauvinistic, but naive, it is because we do not understand the working of the Treasury, and, not understanding it, suspect it.

Bibliographical Services

The third Division, Bibliographical Services, is both the most exciting element of the Library, with its promise of information retrieval of a scope and at a level never before achieved, and the object of envy, suspicion and irritation among librarians who are themselves immersed, or merely paddling, in the treacherous sea of computerization. To those libraries who rely on an up-to-date British National Bibliography, it is held in the same regard as university administrators view their libraries' automation programmes—the plaything of boffins so embroiled in the thrill of experiment that the bread-and-butter service is neglected. The other chap's computer system is by definition more costly and of less use than one's own, and BLAISE is, for all of us, the other chap's computer system. Too much and too soon is always more vulnerable to criticism than too little and too late. Not all of this criticism is the expression of petty jealousy. The Division has often seemed to have too much to do in a short time to be able promptly to give essential information about its plans and progress to automation workers in other libraries who need to know that some element of their systems is compatible with that of BSD. There have been questions of the timeliness of BLAISE, whether it was flung too hastily into the arena. But, given the British Library's key role in the MARC programme, and its need to get involved in Euronet, one is bound to ask the critics whether they could really conceive a situation in Britain now when all that the British Library had to show was steady progress towards MERLIN. We must accept that this other aspect of the Library's wizardry was an inevitable development, and those of us who are involved in computer programmes, and indeed all libraries who intend to make use of centralized cataloguing and retrieval services, must keep in touch with the Division to ensure that it is constantly reminded of our needs and apprised of our views. I am sure that if Richard Coward and Phil Holmes and the rest of this team of experts were alongside me now they would ruefully point out that I need not fear on that score.

Research and Development Department

The fourth element of the Library, the Research and Development Department, is our friend and fairy godmother. The fears, that when it was wrested from OSTI it would become a witch, appear to be unfounded. There has been an increase rather than a decrease in the support given to experimental projects outside the Library. Whether there is some sinister body in the background ensuring that only those projects are supported which serve the British Library's interests, despite appearance to the contrary, we may never know, but no evidence appears. Not everyone would always take the simple line of the librarian who once told me 'What is good for the British Library is good for all of us', but the record of the R & D department suggests that what it supports is good for British librarianship. Its system of refereeing grant applications insures that account is taken of a wide range of views and there is a noticeable consistency of support which is likely to avoid undue waste of effort and resources. The programme of research funded by the Department provides a major contribution to the necessary unearthing of information and to the development of systems which will improve the Library service across the country. The work of librarians is a prime example of that concept, beloved of economists, 'decision-making in an uncertain environment'. Certainty in our sphere of activities is, like the concept of Universal Availability of Publications, an unattainable ideal. All we can hope for is a steady reduction of the areas of uncertainty.

International impact

The reference to UAP reminds us that no library is 'an island entire unto itself'. If we are reliant on other libraries and heavily reliant on the British Library, so is a national library service reliant on those of other countries. In the field of international relations the British Library plays a major role. It is heartening, if occasionally embarrassing, to see how much respect is paid to British librarianship, and I was keenly aware of this recently at the IFLA Conference. British librarians seem to figure in all divisions of the Federation's activities, and among these the senior staff of the British Library are strongly in evidence. This bears out the impression that in international librarianship the British Library is seen as the most comprehensive national library service in the world.

So highly respected is it abroad and so frequently consulted and visited by foreign librarians that, if they are unfamiliar with the way we do things in Britain, they may be forgiven for thinking, as some of them do, that the BL is the headquarters of our national library system. It has to be explained to them that, while the British Library provides us with a considerable national library service, we have no national library system in the strict sense of the term. We have a long tradition of co-operation, though there is room for much more, but it is not well co-ordinated. Could it, within what we call the British way of life, be more closely co-ordinated, without a form of direction which many would find objectionable?

At a recent Aslib conference you heard Al Trezza describe the US National Commission on Libraries and Information Science.[1] There you have a considerable element of direction, which is unlikely to be workable here. Many services which would form part of a national library system are provided by the British Library, and some of them it has taken over voluntarily because no other body could or would do it.

The future

Are we poised for the next logical step, now that the British Library has been firmly and successfully established? The idea of a closer co-ordination of the library services of this country has been in the air for many years, and interest in it has been brought to a head by the publication of the Eighth Report of the Government's Expenditure Committee. The Sub-Committee which considered the contribution of central government to libraries and museums, under the Chairmanship of Janet Fookes, received submissions from interested bodies, and representatives of the Library Association and SCONUL appeared before it to present oral evidence. I was privileged to attend on both occasions, and was struck by the interest which the Sub-Committee showed in what to them seemed a reasonable development of the library scene. It was clear that a number of bodies were directly funding libraries independently of each other. Some of those funds had originally stemmed from the Department of Education and Science, which is advised by a Library Advisory Council, but which apparently does not consult that body about its allocation of funds. The Sub-Committee, considering the need for a closer relationship among funding and policy-making bodies, asked if the British Library could itself carry out the co-ordinating role which was under discussion. I seem to remember answering first that we could not speak for the British Library, secondly that if its representative had been present he might have said that it had enough on its plate already, and thirdly that I thought it would be prevented from carrying out this role under its present constitution. The alternative forms of organization appear to be a reconstituted British Library, the DES or a newly formed independent national body.

The question is very much open at this stage, and the Fookes Committee has recommended that DES set up a committee to examine as a matter of urgency the relationship between the libraries of the country, library advisory Councils and DES itself.

'This body', they say in their report, 'should aim to achieve co-ordination in library policy, in library and information resources, technical services and uniform standards and formats, both bibliographical and technical (including the international aspect). Attention should be given to achieving a more even provision of services throughout the country. . . .' If there were to be an independent co-ordinating body then one would see the British Library as its right hand, since it is uniquely placed in the national context. The question has been asked how such a body could influence developments unless it had 'teeth', unless, that is, it had powers of direction rather than co-ordination. We cannot provide an entirely convincing answer to this question, but if such a body had additional funds—the carrot—then the withholding of funds from the unco-operative would at least be a keen persuader if not a goad. The next question clearly concerns how the funds would be provided without taking them from the present library budget. The only answer is another question 'What price the nation's libraries?'

It is the existence of the British Library as a major element in our library services which has quickened interest in the concept of a national system of libraries. Its impact on the professional life of us all prompts us to consider the next step, the culmination of efforts to make out of a national accumulation of library services of which we are rightly proud, a genuinely shared national library and information resource of the highest excellence.

Conclusion

There are a number of services of the British Library which I have not discussed. High praise is due to it for many valuable and forward-looking services, some of which we take for granted and others which we as yet hardly notice. UK MARC, the National Serials Data Centre, IFLA's Office for International Lending at Boston Spa and its International Office for UBC in the Reference Division and the international exchange programme are all outstanding examples of how a well-organized library on this scale can meet, even anticipate, both national and international needs.

I have interpreted my role in the time available as considering the question—how does it feel to have the British Library among us? It should not feel comfortable, and it does not. It should feel exciting, and it does.

REFERENCE

1 TREZZA, A. F. Towards a national program for library and information services: progress and problems. *Aslib Proceedings*, 30 (2), February 1978, p. 72–87.

DISCUSSION

SESSION 4

MR A. L. SMYTH (Manchester Commercial Library) said that there appears to be an overwhelming emphasis on material relating to academic disciplines in the services of the British Library. It is easy to obtain, for example, the *Andalusian Journal of Entomology* but not an American marketing directory. What is the British Library's policy on business information?

SIR HARRY HOOKWAY admitted that business information was an area of weakness in the British Library but the weakness will be redressed by extending the coverage of this type of information at Boston Spa and by the collection of directories in the Science Reference Library. Sir Harry also drew attention to the work of the Official Publications Library (part of Reference Division) and suggested that more people should use its services.

DR D. A. LEWIS (ICI Plastics Division) stated that there must be a greater degree of industrial representation on those bodies which are determining the British Library policy at a high level.

MR HIGHAM agreed that this was a very important point and showed that assembled at the conference were the representatives of industrial information. Mr Higham suggested that local co-operatives of librarians in industrial and technical areas could be a useful adjunct to the British Library Lending Division.

MR DON KENNINGTON (Capital Planning Information Ltd) agreed with Dr Lewis that industrial and commercial interests are not yet adequately represented in British Library affairs and suggested that the BL should follow the recent initiatives taken by central and local government in providing increased support for the small business. Large industrial concerns are currently very interested in seeking practical ways to help the smaller firms on which they depend and the sphere of improved information provision is one which could and should be examined. The British Library could assist in this area by setting up and evaluating appropriate 'delivery systems'.

SIR HARRY HOOKWAY explained that the information needs of small firms has been considered for many years. The difficulty though was to find someone within the organization on whom to focus the information for internal distribution. Sir Harry thought that the British Library Research and Development Department might fund a research project on this topic.

MR D. W. BROMLEY (Sheffield City Libraries) expressed the view that the larger public libraries were in a unique position to increase the effectiveness of the provision of business and commercial information to the local community and that this was an area where the British Library should seek to provide support for work already being undertaken. A modest injection of funding to support regional reference libraries would result in improved regional resources with an immediate beneficial impact on the local business community.

PROF J. B. WILKINSON said that in order to get industrial and commercial information to small- and medium-sized enterprises the access must be easy. The British Library and University libraries can be frightening whereas the local public library is as familiar as the post office. The problem, as he saw it, was better support and advertizement for local and regional sources of business information.

MR HIGHAM replied that he wished his library was more frightening since whenever he was approached for a publication by one member of the Engineering Faculty, it was always out on loan to a local engineering firm!

DEAN BERNARD M. FRY (Indiana University) drew attention to the fact that last year the British Library withdrew its own research and development reports from BLLD and now they are only on sale direct from London. Why had this happened?

SIR HARRY HOOKWAY explained that the unpriced reports were still available from BLLD, only the priced reports had been withdrawn. The main reason for this move was administrative.

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Aslib Proceedings

AGRICULTURAL INFORMATION SYSTEMS

Aslib Biological Group Meeting, London, 3 May 1978

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The CAB World Agricultural Information Service

John R. Metcalfe

Editorial Director,
Commonwealth Agricultural Bureaux, Slough

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

Introduction

COMING INTO THE information world with a background of scientific research, it is very easy to become confused not only by the jargon of information science but also by the seeming complexity of the information business. My reaction has been to apply the same guiding principle to the information business as I did to my field research, namely to search for the underlying pattern in the belief that the simplest explanation of natural phenomena is probably the right one. This approach has enabled me to take a fresh look at the fundamental purposes of the business in which this meeting is involved. The result may appear to be a statement of the obvious, but I make no apology for this; it is very often the obvious that is overlooked and can bear repeating.

The theme 'Reliability of information' faces one with a number of difficult questions: 'what is reliability?' 'what are its components?' 'how can it be measured?' 'how important is it?' We could go on arguing these questions for a very long time, but I feel that much of this argument will be to no avail unless we are completely clear who are the users of agricultural information and what type of information they need. I shall begin then by looking at the users, try to assess their needs and present information sources, show how these sources could and should interact, and finally describe CAB's specific role in the field of agricultural information now and in the future.

The user

Agricultural information is used by many different categories of people, all concerned to varying degrees with agriculture, and all of whom can be termed agriculturists. It is not just a question of farmers and research workers, but a whole range of people from veterinarians to bank managers, from manufacturers of confectionery to librarians and information officers. I like to see these users as overlapping communities: thus we have the farming community with its supporting services; the scientific community, including universities and colleges; the trading community dealing in commodities; and the food industry. Surrounding these—and imposing the general limits within which these communities must work—are the policy-makers. Each of these communities has

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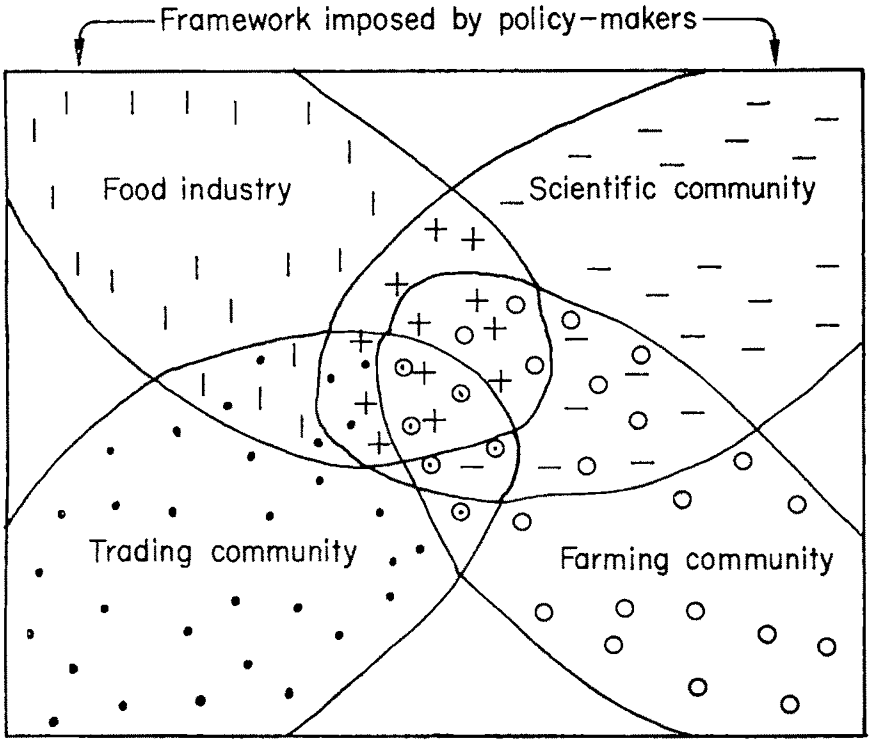

FIG. 1. *The five overlapping communities using information on agriculture*

its own associated and supporting services, so that agriculture becomes a topic without clear boundaries. However, the concept of five overlapping communities (Figure 1) does allow some rationalization of agriculturists' needs. Not only do their subject interests overlap—giving many points of contact between them—but also, as we shall see, their information needs have much in common. From this point of view, the five could almost be regarded as a single user group.

Users' needs

Whoever he is, wherever he may be, our agriculturist will be asking just two questions:

(1) What are the facts?, or
(2) Where can the facts be found?

Admittedly these questions may be posed at different levels depending on the agriculturist's interest, from detailed scientific to the superficial, but the questions remain the same.

Another point in common is that every agriculturist seeking information will want to save time, yet be sure he has reliable information; in other words, he wants to make his information-gathering cost-effective, bearing in mind the particular job he is trying to do.

Let us now see where our agriculturist turns to get his information.

Agricultural information services

We have heard a lot in recent years of the numbers of information sources and the consequent duplication of effort.[1] But is this really the position? Let us look again at the underlying pattern (Figure 2).

Information begins and ends with the user community. It is they who are generating the information, they who are using it, they who will decide what type of service they want. Information is generated initially in the form of raw data, which may be stored as such, or after a greater or lesser amount of processing, refining and scrutinizing. Alternatively, they may be converted into words, refined and stored in thousands of printed journals and then reprocessed into more condensed journal stores, the major bibliographic data bases with world-wide coverage.

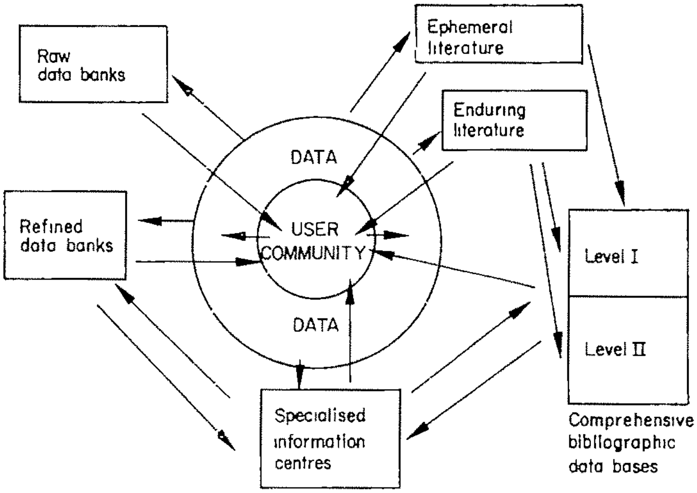

FIG. 2. *The relationship between the user community and information sources*

The major data bases relevant to agriculturists and established for many years include CAB, BIOSIS, *Chemical Abstracts*, *Bibliography of Agriculture*, *Referativnya Zhurnal* and *Bulletin Signaletique*; these have been joined more recently by the International Food Information Service, Information Retrieval Ltd, Aquatic Sciences and Fisheries Information Service and AGRIS. Duplication there may be, but each service is designed for a particular market, a particular group of users. Although some rationalization of coverage and services may seem desirable, each data base exists for a particular purpose, and many reasons—political, technological and financial—will militate against the attainment of a single universal system. Above all, it is unlikely that the users of these services would want a universal system because the incentives for the producers to offer an efficient service would disappear. One can draw a thought-provoking parallel with the motor-car industry; would car owners be content with a choice limited to one make?

The last few years have seen the development of new specialized information centres. These may be subject-oriented, specializing in a particular commodity or practice (rice, irrigation) or national or regional centres with a wide subject remit related to local interests (*e.g.* many AGRIS Participating Centres). Duplication is more of a problem here. Figure 2 shows how these could and should interact, an important feature being the two-way flow of information between the large data bases and data banks and the specialized information centres. Duplication could be reduced particularly if the specialized information centres could use material from the major data bases and data banks, and vice versa. The beginnings of such a system can be seen in some of the new CAB journals, where material from the CAB data base is supplemented by additional material from IFIS, The Royal Tropical Institute, Amsterdam, and other organizations to provide a special service for different commodities, such as rice, poultry and potatoes. This interesting new approach to special services has its own particular problems, such as editorial control; value in cash terms of the respective inputs, and possible effects on sales of the main data base services.

National centres have great potential: some of you will know of the feasibility study conducted by ICL[2] which proposed a comprehensive management information system for UK agriculture, fully computerized. Producers were to be able to use the system for their accounts, storing farm data and using their own and other data to obtain essential management information, while scientists could relate their findings to field practice.

CAB and AGRIS

Where does this leave AGRIS in relation to CAB? It was very apparent at the AGRIS Technical Consultation in April 1978 that problems that concern AGRIS also concern CAB. On the input side are problems such as scope, coverage, timeliness, standardization, quality control, non-conventional literature; on the user side, problems such as circulation of journals, SDI and online services, document delivery and training. It was also apparent that AGRIS and CAB have totally different aims, AGRIS being organized 'to create a comprehensive . . . inventory of worldwide agricultural literature' whereas CAB exists 'to provide a world information service to agricultural scientists and other professional workers in the same and related fields'. The one intends to list all potential sources of information, the other is providing information from selected sources. It follows therefore that CAB and AGRIS are complementary and that they should be developed together as far as possible, recognizing the particular strengths of each service and, most important, their different types of funding—AGRIS being supported by public funds whereas CAB is primarily dependent on its revenue from sales (£2 million in 1978/79).

There are several ways in which integration of the services could be moved forward. At present, CAB is acting as the input centre for the UK, Canada and New Zealand (although it should be realized that this input is a CAB spin-off and therefore conforms with CAB subject coverage and selection policy rather than with AGRIS's); this facility could be extended. Furthermore, CAB has agreed to provide up to two man-years as its contribution to the thesaurus project which will provide a common multilingual indexing and retrieval tool. Areas that should be considered are a common subject classification, and enrichment of input (at least for the UK, Canada and New Zealand) by means of index terms and CAB abstract numbers—thus giving the beginnings of a cross-reference system between Level I and Level II.

I say Level I and Level II deliberately, for although FAO have recently dropped this concept, it has existed for years and will undoubtedly continue. It is exactly the same relationship as that between CAB's *Index Veterinarius* and the *Veterinary Bulletin*, the former listing some 21,000 titles annually, the latter providing abstracts for 7,000 titles considered most relevant. What the *Veterinary Bulletin* has done for veterinary science, CAB is doing for agriculture as a whole. To build on this, CAB is making arrangements with certain national documentation centres—which have ready access to local documents—to beat the problems of timeliness and coverage.

So here you see significant moves towards greater reliability—reliability in coverage, timeliness and accessibility.

CAB Services

I should like to turn now to certain details of the CAB services. Our speciality is information (as opposed to access to information). As Figure 3 shows, we are tackling the world's agricultural literature by constructing an informative bibliographic data base with abstracts and keywords and by publishing authoritative books and review articles, a side of CAB that we plan to develop over the

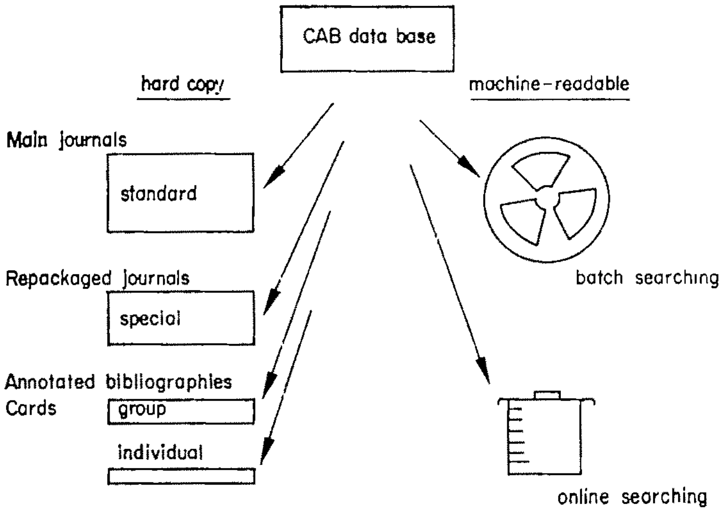

FIG. 3. *Services derived from the CAB database*

next two or three years. Our subject scope is very wide, but with a natural and agreed interface with other services such as IFIS, and the Institute of Paper Chemistry's *Abstract Bulletin*. Many people suppose CAB to be serving literally the *scientist*, the specialist research worker in field or laboratory, but the remit is far wider. It comes as a surprise to many to learn that the speciality of one CAB unit is agricultural economics; this unit has expanded recently to place more emphasis on rural development, and rural extension, education and training. The data base is of course available in hard copy or machine-readable form. The machine-readable form is available for batch processing—undoubtedly attractive to providers of large-scale current awareness services—and online. We are at present online with Lockheed, our test file is up with the European Space Agency, and agreements have been signed to put parts of the data base online with GID and DIMDI in the Federal Republic of Germany—the last three will in due course be connected to EURONET. We are also discussing arrangements with other online contractors both in the UK and elsewhere, our policy being to make the data base widely available at the same rates to all contractors, a market situation that will lead to most usage going to contractors giving the most cost-effective services. Thus, healthy competition increases reliability and level of service, important for us as the data base producer, as it is for the users.

On the hard copy side, we publish abstracts in four modes, four levels of specificity. Most of you of course are familiar with the first level, the main CAB journals, now numbering twenty-five, each of which takes a main aspect of agriculture—such as animal breeding, plant breeding, field crops, soil science, etc. These journals for the most part contain some 5,000–12,000 records each, except for the newest ones, *Rural Development Abstracts* and *Rural Extension Education and Training Abstracts*. Collectively these represent the entire data base. At the next level comes our new series of journals, each dealing with a particular crop or specialist discipline—poultry, potato, plant growth regulators (this can be regarded as SDI with covers on). Third, we have our group profiles (annotated bibliographies), retrospective or current collections of abstracts on narrow topics which may interest some fifty or so persons. (In the computer-dominated age into which we are moving, these smaller selections, available in hard copy, allow the individual to browse through the literature, and give some scope for serendipity). Finally, we can provide collections of such special interest that they can interest only one or two people. The one feature all four modes have in common is to be self-supporting on revenue from users. There is no better yardstick to the value of these services, for librarians' hard-pressed budgets will only allow expenditure on publications when they are needed and give value for money.

The key to this service is of course the abstract. Remembering that the CAB's aim is to provide information, we see the abstract as having two purposes: first, it is an accurate, selective *guide* to the original literature; secondly, it is a *substitute* for the original literature. Many of you, particularly documentalists, may challenge this, but I believe abstracts are widely used as substitutes. For instance, every scientist has his core literature for which he must see the originals—this may be narrow or wide according to his specialization; surrounding this core is a peripheral area he must be acquainted with but which he has neither time nor need to read in the original. Here the abstract (and the review article) is a substitute; this is equally true when the original is in a foreign language or unobtainable. Only 57 per cent of the records in the CAB data base have English as the text of the original, so that much of the rest is inaccessible to many English-speaking people, and *vice versa*. Also important is that often an abstract will supply an essential piece of information or statistic, rendering reference to the original unnecessary. It is interesting that Haygarth Jackson[3] makes exactly the same points as these.

This view of the nature and function of the abstract determines CAB editorial policy, considerable emphasis being placed on information content, accuracy and clarity. All CAB abstracts are prepared and edited by subject specialists according to guidelines very similar to those proposed by Landau and Weiss.[4] Editors are particularly careful to ensure consistent, yet up-to-date, usage of technical terms, particularly scientific names and chemicals, whatever the country of origin or the language of the original article. These are basic standards of reliability which I am sure you would not wish us to relinquish but which would be put at risk, for example, by unedited input. Every record is fully indexed, the index terms also being under rigorous editorial control. Over the years, the indexes for each CAB journal have tended to become oriented to a particular specialist readership; now we intend to re-examine that policy, knowing that many users will be information officers/librarians with a wide range of interests who require consistency across the whole system. To this end, CAB has begun a thesaurus which will be developed both for retrieval and indexing. As indicated earlier, this will be a joint project between AGRIS, CAB and the EEC. One of the starting points for this work will be the CAB word list of 28,000 terms comprising those words most frequently used as index terms. We plan to publish the list this year as an interim search aid.

There are two other matters that are crucially important to our users:

- Selectivity—if someone asks for information and is given 500 references, he looks for ways of saving time, ways of getting to the most useful and relevant information. One solution is for the data base producer to sift out the ephemeral, popular, repetitive or local references: this is what CAB is trying to do, to select on the basis of scientific value, regardless whether the source is regarded as conventional or non-conventional.
- Timeliness—CAB is continually trying to improve in this respect. Currently processing takes three to six months from receipt of article to publication of the abstract, but the greatest delay is between publication of the original article and our actually having access to it. The best solution will be to approach publishers and/or national documentation centres directly for help.

Back-up services

Any organization purporting to be an information service must do more than just publish a data base in hard copy or machine-readable form; it must provide back-up as well. Thus, CAB offers a search service, through which users' enquiries can be answered. These may be done online or manually, as most appropriate, by subject specialists—often the ones that put the information in—so retrieval is as relevant and quick as it could be. Another back-up commonly required—one that is becoming an ever greater problem—is document retrieval, and plans are being made to develop this service to the fullest extent possible. Also needed generally is training, both for retrieval and input, and CAB is planning to develop short courses for agricultural documentalists to be run in conjunction with certain schools of library science in the UK. These should appeal particularly to users in developing countries. We hope that international aid organizations will make funds available to prospective attendees.

What of CAB's future?

CAB is looking to the future with confidence. This confidence comes from knowing that 15,000 organizations worldwide will subscribe £2 million to the CAB documentary services in the coming year, an emphatic endorsement of our role in the enormous international task of ensuring that the agriculturist, whoever he is and wherever he may be, gets the information he wants. The year 1979 will see CAB's Golden Jubilee. During the past fifty years CAB services have expanded and evolved to suit users' needs, but the one unchanging requirement is reliability. Needs will doubtless continue to change in years to come, the most likely trends being more specialized information services and for the abstract and the original document to come closer together in the form of data banks; CAB may well find itself contributing material to these directly from its own sources or indirectly from others. But whatever the form, I would leave one last thought with you: the CAB service is not just a Commonwealth service; it is not just a world service; it is a personal service. The satisfaction of our users and the subscribers is our main concern.

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The integration of manual and computerized information services at the Centre for Agricultural Publishing and Documentation

H. C. Molster

Centre for Agricultural Publishing and
Documentation, Wageningen, The Netherlands

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

Introduction

THE CENTRE FOR Agricultural Publishing and Documentation, or *Pudoc* for short, is a legal entity under the Ministry of Agriculture and Fisheries of the Netherlands. Within the Ministry, it is directly responsible to the Directorate for Agricultural Research. (There is at the moment no formal relationship with the National Agricultural Library. The latter belongs to the Agricultural University, also located in Wageningen.) According to its charter, Pudoc has the aim to advance agriculture through publishing and documentation activities.

Its publishing aims are achieved through assisting agricultural research bodies in editing and publishing their work, issuing publications, advising on grants to scientific journals in which agricultural research bodies publish their findings, arranging and editing translations and training agricultural editors. All these functions are in fact carried out more or less intensively. The publishing department is actually a medium-sized scientific publisher which produces some thirty-five titles per year. The monographs published are mainly manuscripts that are not attractive to commercial publishers, but still deserve professional production and distribution. This department employs at the moment a staff of eleven people.

Before discussing the documentation department, I should also mention our well-equipped printing plant which serves the agricultural community. Recently the printing office has developed more into a brokerage and advisory service for a rapidly increasing volume of printing jobs with its own facilities as backup.

The Documentation and Information Department

The official tasks of the Documentation and Information Department are the following: to provide a central literature documentation and information service in agriculture, and maintain contacts with special literature documentation services; to supply information from the agricultural literature; to issue publications arising from these activities; to give advice and instruction on literature

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documentation; to improve and elaborate classification systems for agriculture and develop documentation techniques. These tasks are very broad indeed! They certainly do not all get the same emphasis and they are all carried out within the rather severe limits of personnel and money. The present distribution of work is probably best illustrated by a breakdown of the present staff of the department, as is given in Table 1.

1		department head
1		department secretary
3½		documentation *strictu sensu*
	2	*Landbouwdocumentatie*
	1	*Pudoc Bulletin*
	½	*Euromarktlijst*
2½		manual current awareness
1¼		computer current awareness
¾		AGRIS input
4		bibliographies and literature reviews
14		TOTAL

TABLE 1: *Staff of the documentation department*

The activities of the documentation department can be divided into two types, depending on who takes the initiative: Pudoc itself or its clients.

Services initiated by Pudoc itself are first of all three regular publications:

Landbouwdocumentatie, which means 'Agricultural Documentation', is a weekly bulletin in Dutch with abstracts of general interest to agricultural scientists, extension officers, agri-business, etc. in the Netherlands, selected from the world literature in Western European languages, available at the University library and the Library of the Ministry of Agriculture and Fisheries. It includes about 5,000 titles per year.

Pudoc Bulletin is a quarterly bibliographic title list of publications on agricultural research by Netherlands scientists, with approximately 2,000 titles per year.

Agricultural Aspects of the Common Market is a monthly list of publications related to agricultural affairs of the European Common Market. It includes about 2,600 titles per year.

All these publications are in fact information services which we initiate ourselves, in contrast to information services provided at the request of specific clients.

Another activity which we carry out for an impersonal audience is the preparation of input for the AGRIS system of the FAO. For this system, bibliographic descriptions are made of all documents published within the Netherlands, and within the scope of agricultural sciences. Pudoc makes and maintains two documentation systems for its own use: one is the card file of all entries into *Landbouwdocumentatie* and the other is a file of all bibliographies compiled on request, to which various other bibliographies are added. These documentation systems are used as a first resource in answering requests for information, but Pudoc relies most heavily on documentation systems made by others. We ourselves have a (substantial) reference library and are probably the most frequent users of the reference library of the Agricultural University.

After having discussed the information services provided on Pudoc's own initiative, I shall now describe the information services provided at the request of individual clients. We offer four different types of these services:

1. a current awareness service, whereby people are alerted to new literature which has appeared in their special field of interest. This service is provided both by a manual and a computer system. It is a subscription service, whereby the titles are provided regularly as they appear in the primary literature for the manual service and in the secondary literature for the computer service. The three other services are replies to once-only enquiries:
2. answers to very simple questions, which can be provided with a minimum of effort,
3. bibliographies, whereby a list of relevant titles is made for specific queries. These bibliographies can range from a few books on a certain general subject to a bibliography for a dissertation which should be as complete as possible.
4. reviews of the literature whereby the literature is not only compiled but also analyzed and made into an evaluative or state-of-the-art report.

The current awareness services and the compilation of bibliographies on request will be dealt with in more detail, but first, I will discuss the groups of people we try to serve. Pudoc's clientele is potentially very large because Pudoc's task is to serve the whole agricultural community in the Netherlands. It also deals with foreign requests, although they get a low priority. In practice, most of our clients are workers in agricultural research. Information for farmers is the responsibility of the extension service. Information for the extension service can be Pudoc's responsibility but requests from that area are only incidental. The weekly publication *Agricultural Documentation* has extension officers as one of its target groups to keep them generally up to date with scientific developments. General information about agriculture in the Netherlands for all kinds of non-professionals is also dealt with at Pudoc to some extent, although the Directorate for External Relations of the Ministry of Agriculture has a special service for such people. Agricultural researchers can, of course, come from a wide variety of institutions such as private industry, the Agricultural University, non-profit research institutes and governmental research outfits both from within the Ministry of Agriculture and from other ministries.

Work is generally done on a first-come first-served basis. However, when delays build up, work for the Ministry receives priority. To fulfil all Pudoc's functions, the staff of about forty is extremely limited. We have not advertised our services, apart from book publishing, but have been satisfied to serve those who knew where to find us. If everyone knew we offered bibliographies and even sometimes reviews free of charge, we would be snowed under. The relatively early introduction of computer services was certainly motivated by the idea that we might be able to do more for more people without an appreciable increase in staff.

The current awareness services

The manual current awareness service is based on all periodicals arriving at the central library of the Agricultural University. Some 150 are processed daily. These journals are scanned for articles which seem relevant for one of the forty clients of the service. Many clients have a standing order for photocopies of those articles judged relevant for them by the screener. This service has two special qualities: the availability of the full document is guaranteed; and it is possible to specify almost any selection criterion because the full texts of the original documents are actually seen by an information specialist. The service is limited by the journal collection on which the service is based, and by the fact that we cannot employ more than one person for this job. (Differentiating between forty interest profiles is a remarkable feat for one person.) It is a very labour-intensive service. These limitations prompted our interest in the use of computer retrieval for selective dissemination of new information. After some preliminary work in 1972, we started with a feasibility study in 1973. This study was called the ALADIN project which stands for *Automatisering van LAndbouwkundige Documentatie en Informatie in Nederland* (automation of agricultural documentation and information in the Netherlands). The aims of this project were to investigate the technical feasibility of a computer-based current awareness service for agricultural research in the Netherlands, and to compare the quality and cost of such a service with those of the existing manual current awareness service. The project was originally financed by the Netherlands Organization for the Advancement of Information Services (NOBIN). Under the project 100 people received monthly output from CAIN and where relevant from *Chemical Abstracts Condensates*, *Biosis Previews*, *Food Science and Technology Abstracts* and Medlars. The project as such ended in April 1975 when the financing was taken over by the Ministry of Agriculture and Fisheries. It is now one of Pudoc's regular services. The feasibility study itself can be considered a success: the service has proven to be technically feasible. It withstood the comparison with the manual service very well indeed, although it cannot outperform the manual service in all aspects.[1] The main advantage of the computerized current awareness service is that there are virtually no technical limits to growth. Our computerized service is also clearly cheaper than our manual service; the difference calculated as cost-per-relevant-title is even larger than that based on total subscription cost. The total cost for the computerized service is of course very dependent on the number of data bases processed, the number of search terms used and the number of titles in the output. For the manual service the search costs are virtually fixed. It only costs secretarial time to type an alert-card for every title found.

The increase in the number of clients for the computerized SDI service is limited mainly by the lack of personnel to construct and monitor new profiles (in our experience, one person can construct and monitor a hundred new profiles a year) and by money, or, to be more precise, the effort needed to convince potential clients that the service provides value for money. The number of profile formulations for the Pudoc SDI service was 116 in December 1975, 152 in December 1976, 252 in December 1977 and 282 in March 1978. We expect to reach 350 by the end of this year. These figures refer to the number of subjects for which the various data bases are searched. These are different from the number of profiles per data base. At the moment we process the data bases of CAIN (now called AGRICOLA), FSTA, CAB and AGRIS under our own jurisdiction. We act as intermediary for quite a number of profiles on *Chemical Abstracts*, which are processed with the same software on the same computer, but for a different organization and for *Biosis*, which is processed by the Biological Information Service in Nottingham, UK.

In March 1978, the number of profiles run on the various data bases were 135 on AGRICOLA, 159 on CAB, 91 on AGRIS, 46 on FSTA, 29 on *Biosis*, and 56 on *Chemical Abstracts*, making a total of 516. Because the number of profile formulations was 283, the number of data bases used per profile was on the average 1.8.

At present the choice between the manual current awareness service and the computer-based service is usually made by Pudoc itself based on the perceived needs of the client and the possibilities of both services. The manual service works more or less at full capacity and cannot accept new clients easily. At the moment it is difficult to increase the staff for the manual service because the real costs are much higher than the price we charge. To what extent labour costs should be recovered from clients in a governmental organization has always been a difficult question. When the service first started, the price we asked was considered high in relation to the other services which were free or very cheap. But over the years we have not increased the price very much, whereas labour costs have increased heavily. Thus, at the moment the price for the manual service is about one-sixth of the actual cost.

The price for the computer service was originally fixed at the average of the price for the manual service in order not to provoke any competition. This principle will probably be adhered to in the near future. The present price for the computer service more or less covers the cost of the computer but not that of the staff. Although it is not likely that the manual service will be increased in the near future, it is also not likely that it will be discontinued because the screening of journals has to be done anyway for our AGRIS input, for *Pudoc Bulletin* and for some other purposes.

Bibliographies on request

It has long been one of the major activities of Pudoc to make bibliographies on any subject within the field of agriculture in its broadest sense on the request of interested persons. Prior to 1975, this service was free but not greatly publicized. The main information sources used for the compilation of these bibliographies were the major bibliographic journals, various other once-only bibliographies, reviews, the holdings of the Agricultural Library at Wageningen especially with regard to handbooks and reference works, and informal contacts with specialists.

In 1974, the first connection was made between the terminal at Pudoc and the Lockheed computer in California to test the new possibilities that online information retrieval offered. Since that time, we have become enthusiastic adepts of this information tool as it provides immediate access to a large variety of bibliographic sources with a much reduced effort. Parallel to our experience with the current awareness service, computer searching has increased our labour productivity quite substantially, even though the total cost per search is not much lower than that for a manual search. For a bibliography made in the traditional way, we reckon an average of five man-hours. Our average computer connect-time for one question is about forty minutes to which the time for the interview, preparation for the search and control of the output should be added, totalling roughly one and a half man-hours. Present labour costs for a junior information specialist are Dfl. 48 per hour, and computer costs are approximately Dfl. 5 per minute. An average manual search would thus cost Dfl. 288 (6 × Dfl. 48) and a computer search Dfl. 272 ($1\frac{1}{2}$ × Dfl. 48 + 40 × Dfl. 5). Thus total costs for both methods are comparable, but with the aid of the computer one information specialist can deal with 4 times more requests.

(This result is similar to the one reported by S. Johnston and D. Gray in 1977, but their results are based on less extensive searching and much lower hourly rates for labour. In 1977, we used a total of 251 hours of computer connect-time, 178 of which were used to answer 252 requests; the rest was used for demonstrations, training and other internal needs. The main data bases used were AGRICOLA (28 per cent), CAB (15 per cent), *Biosis* (15 per cent), and *ChemAbs* (13 per cent). Now that we have just been allowed an extra staff member a further increase of online searching is expected.)[2]

Integration of on-line searching in established work patterns

Computer use started in Pudoc as an enclave, not really accepted by the head of the department and other old hands. When I started with the ALADIN project I was looked upon as some kind of 'whiz kid'. Even when more people were employed who learnt how to use the computer we were still referred to as 'the computer boys'. We did our own marketing, and had our own group of clients. Integration is still limited, as there is no well-established process of deciding *who* should do *what* to *which* enquiry. We became convinced rather quickly that the use of computer-readable files is just one tool in the large toolkit of information specialists. However, theory is one thing, practice another. Our special problem is the fact that the two main computer search-formulators have only a professional training as scientists but no formal training in information. They are still waiting for it, but they cannot be released from their job. . . . Both have learned search formulating for computer retrieval on the job. Thus, at the moment it depends on circumstances whether an incoming question is handled in the traditional way or given to a computer search specialist. The computer search specialists do occasionally consult traditional information scientists to add to their results from traditional sources, especially if a client wants a bibliography including material dating back further than the computer-readable files available. On the other hand, questions with which traditional information scientists are confronted are sometimes given to computer search specialists, but this is more the exception than the rule. The speed with which a computer search can be performed is often very attractive both to the client and to the information specialist and has a big influence on the decision about which information tool to use. For the many clients who do not need an exhaustive search but are well served with a list of between 20–200 titles, a computer search of the most recent material is very attractive. On the other hand, important printed information sources and information from local specialists on the subject may be overlooked. These might have provided an even more efficient answer for the client. I hope that in the future questions will be distributed to information specialists according to their subject specialization and will be answered by this one person by using all relevant sources available. I also hope that there will be rather intensive informal contact between all information specialists about the questions in portfolio both with regard to search strategies and computer files, and any other relevant information sources.

Even though, in my view, information specialists in an organization like ours should primarily be subject specialists, it is very likely that each of them will develop an expertise in a specific information technique. Consequently, co-operation between the information specialists is required if a certain technique is needed by a subject specialist who has not specialized in that particular technique. It is essential that the responsibility for answering a question remains with that person who is the subject specialist for that question.

Pricing at Pudoc

We have decided on a flat fee per enquiry, not depending on the amount of work or computer time needed. In this way, the client receives a bibliography at a price he knows in advance. If he is not satisfied, he can come back for more information which will be supplied for the same price as long as his request is reasonable. The fact that some enquiries can be answered very easily whereas a tremendous amount of work is necessary for others, is generally not caused by the client but by the structure of the information sources available and the knowledge of the information specialist. Thus in our opinion, the amount of our effort should not be reflected in the price. The present rate is Dfl. 250 per enquiry. Simple questions are answered free of charge, but for very complicated questions we may ask a higher price.

Document delivery

The use of many computer-readable files has increased the number of references in our bibliographies that are not easily available. Even though the Agricultural Library at Wageningen is about the fifth largest agricultural library in the world, it has difficulties in fulfilling requests for exotic documents which are now requested more and more frequently. Whether a paid-for document delivery service should be set up to deal with these difficult cases, is under discussion.

It is wise to discuss with the client in advance how fast he needs the full documents, because if the only thing he can use is a few articles immediately, the search should be restricted to readily available documents. It is because of these special needs that documentation systems based on local collections only will continue to serve a purpose for quite some time to come.

Outlook

The difficult national economic situation also has its repercussions on Pudoc's activities. A further increase in the volume of our services is only possible if special funding is forthcoming, but this is not likely to happen. Of course we can make a good case for the necessity of more intensive use of information sources: the information explosion entails special measures to cope with it and especially in times of scarcity one should use existing knowledge as intensively as possible in solving new problems before embarking on new research. However, others can generally defend their own budget requests with equal strength. To get funds transferred from research to information is even more difficult, even though the total amount of money needed for information is generally only a few per cent of the total research budget.

The place where the information is financed is also of importance: at the moment it is our experience that information is spread more easily if it is financed from a central budget, rather than from budgets for individual research projects. However, the latter approach may give a better insight into the total project costs. Only when clients get hooked on information are they willing to pay for it themselves. However, researchers need retrospective searches rather infrequently, so that many people have to be convinced before one can rely and build on a sizeable group of converts. Therefore the near future will probably bring only slow but persistent growth to our services. Some consolidation may also be a good thing, because we have had little time to adapt our own organization to the vast possibilities that the computer era has brought us.

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UK liaison with international agricultural systems

F. C. Hirst

Principal Librarian,
Ministry of Agriculture, Fisheries and Food, London

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

RATHER THAN REPRESENT Ministry of Agriculture, Fisheries and Food (MAFF), or any other, official policy, I wish to express my personal views on the UK–international scene. As I am the UK liaison officer for AGRIS (International System on Agricultural Sciences and Technology), I will give this system major consideration—but there are other international systems which entail considerable UK involvement, not least, the Commonwealth Agricultural Bureaux (CAB).

Commonwealth Agricultural Bureaux

The significant financial input apart MAFF, and the UK 'Focus for agriculture' at a later stage, have played a useful part in suggesting developments since computerization of CAB's production of its abstracts and index journals. These were largely pragmatic—gaps in existing subject coverage (*e.g.* agricultural engineering) and topic coverage (*e.g.* poultry abstracts, plant growth regulator abstracts) needed by Agricultural Development and Advisory staff.

AGRIS

Concerning AGRIS, the UK participation is considerable and has been ever since the pre-planning stage. All aspects of national policy are considered regularly by a 'Focus for agricultural information', comprising all UK official interests—home and overseas departments and representatives from the British Library R & D Department. In the Ministry of Agriculture, Fisheries and Food a Policy Steering Group (PSG) considers AGRIS affairs as the need arises. The UK government Inter-departmental Consultative Committee on Scientific and Technical Information (ICCSTI), is also aware of AGRIS affairs. There is a considerable degree of common membership among Focus, PSG, and ICCSTI; national representatives on the European Communities' Committee on Scientific and Technical Information (CIDST) and its Agricultural Working Group (AWG)—who are also members of the three UK groups—are concerned with the European input to AGRIS, EUR-AGRIS. The UK AGRIS liaison officer and input officer play an active part in the EUR-AGRIS workshops regularly held under the auspices of the AWG.

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Agrindex

The actual input of UK material is prepared under contract by the Commonwealth Agricultural Bureaux (CAB) Systems Group in computer tape format, and forms part of the cumulated European Communities' input, EUR-AGRIS. In 1975 and 1976 UK input reached some 7,000 entries and in 1977, 9,500, in AGRINDEX totals of 48,000, 77,000 and 97,600, respectively. This UK input is, in effect, an extract of the author, title and bibliographical details (to *AGRIS Guidelines* specifications) of the UK published material input to the CAB abstracts data base. Canadian and New Zealand AGRIS input has subsequently been developed on similar lines. Close contact is maintained with the Input Centre by the liaison officer. Originally, in return for the input effort and cost, four quota copies of *Agrindex* and one copy of the AGRIS computer tape were received at the UK liaison office; these were made available to UK interests. Additionally some eighty FAO quota copies of the printed *Agrindex* were received and widely distributed in the UK. Since the printing was taken over by Apimondia—in fact from Vol. III, No. 3—only two 'quota' copies have been received, and this is inadequate for effective exploitation in the UK; restoration of the original four copies and an additional six is currently being sought. These will be readily available for use in government-funded libraries, usually associated with ready access to computer terminals. The tape is available from the liaison office, for potential use; and an experiment is planned to assess its use inhouse in MAFF for retrieval purposes. The 140 MAFF libraries have a central Library Computer Services Centre with a dedicated terminal and other laboratory and regional libraries also have ready access to terminals. Preparations are well in hand to take part in the experimental tape search programme being mounted by INIS/AGRIS in Vienna.

There was insufficient expressed demand to qualify the UK for the bulk subscription to *Agrindex* offered by Apimondia from Vol. III, 1977 and few organizations appeared to be able to justify paying a full subscription considering the present financial climate and the state of development in which they found *Agrindex* in 1975–6. With more publicity, especially now that the US and other countries' input is increasing, and with the introduction and eventual implementation of the improvements envisaged in the UNISIST *Appraisal report*, the subject of discussion at the recent Technical Consultation of AGRIS liaison officers, this low demand could change.

AGLINET

AGLINET, Agricultural Libraries Information Network, is a back-up service to *Agrindex*. Like *Agrindex*, it has been called upon only infrequently (but always successfully) to provide either hard copy of a desired reference or a location where such hard copy is likely to be available.

AGRIS stage two

There is an informal group in the UK which has been very much concerned with developments at this level in the field of tropical agriculture. It made an extensive report on AGRIS Tropical to the AGRIS Co-ordination office in

May 1977, in response to a follow-up request from the AGRIS panel of experts after their meeting in May 1976.

AGREP

A permanent inventory of agricultural research projects in the European Communities is another co-operative venture. The Agricultural Research Council is the UK co-ordinator of input. Two volumes were published in 1977, covering some 12,000 research projects operating between 1973 and 1976; the record is also on magnetic tape and searchable in the Brussels and Luxembourg offices of the Commission of the European Communities. A revision is being undertaken and more complete coverage is the goal.

I believe that, by mentioning CAB, AGRIS, *Agrindex*, AGLINET, AGRIS stage two and AGREP, I have at least touched upon the major UK activities in a fruitful field of co-operation.

The use of computer-based bibliographic information services in the Ministry of Agriculture, Fisheries and Food

D. E. Gray and
Susan M. Johnston

Ministry of Agriculture, Fisheries and Food,
Library Computer Services Centre,
Central Veterinary Laboratory, Weybridge

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

Investigation of the value of mechanized services

DURING THE BEGINNING of the 1970s it became apparent to the UK Ministry of Agriculture, Fisheries and Food's library service that the mechanized information revolution was upon us. We had taken part in a number of investigations which indicated that the technology was well developed and reliable. We knew, in addition, that large-scale commercial services were available. What we did not know was what the real value of these external services was to the Ministry. They were all derived from very familiar printed secondary journals. Did mechanized operation offer substantial advantages? Was the cost justified? How could mechanized operations fit into the present library activities? If mechanized services did offer improved facilities, what administrative arrangements were necessary? It was decided, therefore, to attempt to answer these questions by the evaluation of external computer-based bibliographic information services under practical conditions.

For the evaluation of online retrospective searches, we used the data-bases in their printed form as the standard against which mechanized searches were judged. We studied seventy-five searches by doing all of them online and manually. All searches were made as a result of real requests for information received by the Ministry's library and information services. The seventy-five searches were selected so that all the Ministry's subject interests were covered. Our evaluation of the retrieval performance of the online retrospective searches was based entirely on the enquirer's reactions. Each enquirer was asked to evaluate both the online and manually produced lists by indicating which items were of value.

The main part of our investigation was concerned with online retrospective searches. We did, however, realize that there would be a demand for SDI services and to study the nature and amount of this demand we provided forty-seven SDI services from external centres. The retrieval performance of each service was estimated from the users' pertinence ratings of the references pro-

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duced, and the general value of the SDI services was determined from a questionnaire which users were asked to complete. This work will be followed up by a more detailed study of the SDI requirements of the Ministry. We are interested in whether it would be more efficient and economic to provide an inhouse SDI service from the Commonwealth Agricultural Bureaux (CAB) tapes than using the external services which we use at present. We hope to start our investigation of the inhouse SDI service this year.

For the retrospective work we used Lockheed Dialog and Medline online, the latter initially as part of a British Library Research and Development Department investigation; Medline is now used through Blaise. The main sources of SDI services were Pudoc (the Dutch agricultural information service) and UKCIS, the United Kingdom Chemical Information Service.

The investigation reached certain conclusions which we felt could form the basis of the development of the use of computer-based bibliographic information services throughout the Ministry. Online retrospective searches were at least as effective as manual searches, little more expensive (from about £12 to £15 compared with £12 for a manual search) and, of course, very much quicker: including preparation time they took only about one sixth of the time of a manual search of the printed version of the database.[1] The SDI services were well received and there was a clear indication that there was sufficient potential demand to make an inhouse SDI service economical.

Establishment of a mechanized information unit

Management accepted that the investigation had demonstrated that mechanized services were valuable in the Ministry's particular circumstances, and that this should be exploited by the establishment of a Library Computer Services Centre.

Our experiences during the investigation had indicated that mechanized services are much better used by a librarian or information officer on behalf of an enquirer. Although enquirers were interested in the mechanics of searching, and the speed of reply of the services online was always fascinating, no enquirers showed any disposition to develop the skills required to do their own searches. It was, however, clear that search strategies are best formulated in close co-operation with the enquirer, and that retrospective online searches should be carried out by a local librarian or information officer whenever possible. SDI services on the other hand are best provided from a central source. This allows the best use to be made through group profiles and avoids duplication. In addition, the prospective inhouse service must be administered centrally.

The Centre has established a programme of training intermediaries wherever librarians or information officers have access to a computer terminal. Terminals are not available throughout the Ministry at the moment although the situation is improving. Where no local terminal or intermediary is available, online retrospective searches are made at the Centre. It is hoped that in a short time all online retrospective searching will be decentralized with the advantages of speed and the use of intermediaries' specialist knowledge of the requirements of their own library users.

The Centre has responsibilities for continuing research on the use of mechanized information (its current preoccupation is the establishment and evaluation of SDI inhouse), co-ordination, publicity and administrative control of the use of mechanized information systems.

The Centre was established in March 1977. Publicity has consisted of lectures to groups of potential users, a general announcement of the establishment of the facilities for mechanized services as an official notice, articles in the Ministry's house journal and visits to libraries and information units. The publicity has been effective; demand is growing satisfactorily. Retrospective searches are being carried out at the moment at a rate of 800 per annum and we expect to provide 1000 searches during 1978/79. Mechanized retrospective searches are in many cases an alternative to a manual search, and whether a particular search is done manually or mechanically depends on the judgment of the intermediary making the search. He has to work within a budget, each intermediary being allocated a sum of money which he is at liberty to use in the way which he considers to be most effective in the light of local circumstances. The most experienced intermediary in the system finds that it is desirable to carry out online searches for about one third of the enquiries received. The Centre and all intermediaries spend between five and fifteen minutes online for each search. This period relates to the particular needs of MAFF staff who are not, in general, engaged in fundamental research but are looking for answers to particular problems. High recall is not always necessary and time and money need not be spent online in an effort to achieve this by searching many data-bases. Similarly there is no need to go to much expense in achieving great precision in the list produced by the search. We have found that relevance as low as 20 per cent is, in practice, quite acceptable. Our enquirers seem to be quite happy to look through a long list of references to pick out the few items which will either give them directly the information they require or will provide them with sufficient references to give them a lead into the literature on their topic. It is possible that they feel that a long list, even with many irrelevant references in it, indicated that the search has been made thoroughly.

In a minority of cases, comprehensive lists are required for scientists writing review articles or making a comprehensive survey of existing knowledge before starting a major project. This necessitates more elaborate and expensive mechanized operations backed up by manual searching and editing of the result.

The use of the available databases seems to have settled down to a regular pattern, and an analysis of the retrospective searches made in the last quarter of 1977 is given in Appendix A. In about 46 per cent of searches, satisfaction was achieved by the use of one database alone.

This does not reflect the very wide dispersal of material found by Brodauf and others[2] for veterinary material in the large databases, where only 20 per cent was in one database. Brodauf and his collaborators were however attempting to provide comprehensive lists of references, a type of search infrequently required by Ministry enquirers.

Even where we find it necessary to search two or more databases, in most cases these are CAB and Agricola, the two general agricultural databases currently available online. We have found them to be complementary, Agricola tending towards the more practical and extension side of information and CAB to the more scientific. The greater use of Agricola (67.5 per cent of searches) than of CAB (51 per cent) reflects this as there are more field and extension service staff in MAFF than laboratory scientists. In addition, when either database is likely to be acceptable, Agricola is chosen because it is cheaper, there being no royalty charges to pay.

User reactions

Online retrospective information services have been well accepted by enquirers. There has been a rapid build up in demand after only a modest amount of publicity. Many enquirers come back for more searches having been satisfied by the results of their first search. Analysis of the results of retrospective searches made during the investigation gave a precision of between 20 per cent and 80 per cent, and similar results are obtained in routine service searches made since the Centre was established. The effect of the intermediary screening the printout before sending it to the enquirer was studied during the investigation. The deletion of irrelevant references naturally increased precision, in some cases quite dramatically, but it was found to be dangerous. Some references deleted were later assessed by the enquirer as pertinent. This is possibly due to an enquirer not expressing his real requirements in his original request for information. Screening is, in practice, not normally undertaken, except for the deletion of completely irrelevant items produced by false drops.

Reliability of the online systems

When we moved from the experimental use of the systems to service use, we were concerned with reliability. In the initial stage, when we were hoping that enquirers would accept mechanized information as a normal extension of the library and information services already available to them, it was particularly important that the use of mechanized information should involve no unusual delay in meeting requests. The two systems we principally use, Lockheed and Blaise, have proved satisfactory. They are seldom unavailable and we are impressed by the speed of delivery of Lockheed offline prints which we can expect to get in about six days even though they have to come all the way from California. We tend to use Lockheed in the mornings, obtaining more rapid response at that time before the USA users go online from about noon onwards, although since the installation of a larger computer in January, response times in the afternoon have been acceptable.

Selection of databases—subject content

When we select a database to be used for a particular enquiry, it is sometimes automatic—the subject content of the database matching that of the enquiry exactly; examples are Chemical Abstracts for analytical studies or Medline for material on human clinical medicine. More often a choice is available, Agricola or CAB for general agriculture, Medline or CAB for veterinary material, Toxline, Chemical Abstracts or Biosis for toxicology. The content of the database is particularly important when choosing between Agricola and CAB. The former has been found to be preferable for general enquiries as it contains much material of a practical nature, such as agricultural engineering and buildings, and even some of the extension material not included in CAB. The latter covers thoroughly the more scientific literature, including material from the basic sciences, and is consequently used for enquiries from the laboratories, particularly when a narrow or precise topic is required. In addition, as the printout can incorporate abstracts, the resulting list is very useful for those enquirers who are not located near large libraries.

Selection and use of database—entry points

The selection of a database and certainly its economical and efficient use is greatly influenced by the nature and number of entry points (the different kinds of data elements available for searching) which can be used in the different databases.

A fundamental difference between entry points is whether their vocabulary is controlled or uncontrolled. Examples of each kind are:

Title words	Uncontrolled
Abstract words	
Free-language indexing	
Thesaurus indexing	Controlled
Narrow codes (*e.g.* CA registry numbers)	
Broad codes (*e.g.* Agricola subject categories)	

Some types of enquiry need a database with a controlled vocabulary; search strategies for other enquiries are more easily formulated for a database's uncontrolled entry points. If material on the biology of a particular taxonomic group is required, the Biosystematic Codes ensure the retrieval of everything that is in Biosis on all the organisms in the group. Controlled vocabulary is particularly useful when the terms are arranged in hierarchies and the hierarchies are available for search formulation. The MeSH terms of Medline are of this form and sometimes indicate the selection of this database when a whole category of terms (such as antibiotics) is required in a search formulation. In a Medline search this would be represented by one item in the search whilst in the free language databases we use this would involve entering the individual names of at least all the major antibiotics with no guarantee that all relevant items would be retrieved.

It must not, however, be assumed that controlled vocabulary entry points are necessarily more efficient than entry points with uncontrolled vocabulary. The good results we have obtained from free language searching of titles in Agricola show this. Uncontrolled vocabulary is even preferable when very precise topics are required; the more precise the topic, the more likely the exact word defining it may be expected to appear in the title. A term in the uncontrolled vocabulary is, of course, the only source of a searchable element when a topic is not available in a controlled vocabulary. The names of new concepts inevitably appear in titles much earlier than in a controlled vocabulary.

Free language searching must be used with some discretion. False drops are not in general a problem; the lack of accuracy which results is only really significant when compared with the precision obtained when using a precoordinated pair of terms from a controlled vocabulary. We have, however, had some trouble in free language searches of the CAB database. The normal Lockheed search procedure involves searching the abstract as well as title and indexing terms. Searching the abstract produces an unacceptable number of false drops when one of the search terms is a very common word which increases the chances of a false association of unrelated words. We tend to restrict searches on the CAB database to title words, indexing terms and journal sequence codes.

Conclusions

Experience in using the computer-based bibliographic services as part of the normal MAFF library and information services has confirmed the conclusions of the investigation. The retrospective search service is well established, providing a service throughout the widely dispersed Ministry and increasing very substantially the information output of the existing library and information staff. Our next development is in the development of the SDI service, probably based on the inhouse use of CAB tapes which, with the established retrospective service, will give a complete mechanized information service to MAFF.

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APPENDIX A

Use of databases—analysis of 200 searches made from October to December 1977

One database used per enquiry		
Agricola	39	93
Meline/Toxline	20	
CAB	15	
Biosis	14	
Chemical Abstracts	5	
Two databases used per enquiry		
Agricola + CAB	48	66
Agricola + FSTA	7	
Agricola + Biosis	4	
Biosis + Medline	4	
CAB + Chemical Abstracts	2	
Chemical Abstracts + FSTA	1	
Three databases used per enquiry		
Agricola + CAB + Biosis	17	38
Agricola + CAB + FSTA	11	
Agricola + CAB + Chemical Abstracts	3	
Medline + Biosis + CAB	3	
Agricola + Medline + Biosis	2	
Agricola + ChemicalAbstracts + FSTA	2	
Four databases used per enquiry		
Agricola + CAB + Chemical Abstracts + FSTA		3

Overall use of databases	
Agricola	used in 67.5% of searches
CAB	" " 51% " "
Biosis	" " 13.5% " "
Medline	" " 13% " "
FSTA	" " 12% " "
Chemical Abstracts	" " 7.5% " "

The information service of the National Institute for Research in Dairying

B. F. Bone

National Institute for Research in Dairying,
Shinfield

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

SOME FOUR YEARS ago I was instructed to set up a selective dissemination of information service for the Institute, on the grounds that highly paid research scientists devote too much time to keeping up with the literature. Our Director envisaged a weekly delivery of cards or reference lists tailored to the needs of the individual researcher; in the event, we found it practical to group the projects constituting the total research effort into about thirty subjects, and to make these available on demand.

Staffing presented problems in a 'no growth' situation. Fortunately one of the departments had already made use of a scientific worker to provide them with such a service; Norman Briggs was therefore transferred to the Library and Information Unit and extended his coverage from aspects of ruminant nutrition and metabolism to the animal side in general. A Chemistry graduate working part-time for the library was made full-time and given responsibility for microbiology and biochemistry; as she moved to a different job at that time we appointed a Bacteriology graduate, Frank Sayles, to take over this side. Some of the remaining projects were covered by myself.

Incoming literature, including primary material, abstract and title services, are scanned on receipt and appropriate references selected. Rather than use project descriptions or key words, we interview and keep in touch with the researchers so that we have a detailed knowledge of their requirements. We tag the references with project numbers and additional indexing terms, and I make a record of the items selected, partly to prevent duplication of input from different sources.

No additional clerical staff was available. The three who dealt with library routines, therefore, had their work load greatly increased. We eliminated the less valuable routine duties and provided a word processor which facilitated reference selection after items had been recorded in random order. Phase two was reached a few months ago when we decided to change to computer operation.

The computing complex at Rothamsted, which endeavours to meet the computing needs of the Agricultural Research Service, was able to offer only the FAMULUS software, which seemed inadequate to us. We therefore decided to use ICI's ASSASSIN suite and to send our input, via Rothamsted, to the ICI

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computer at Billingham. The service is somewhat slowed down at the moment whilst we cope with the initially heavy indexing load, but we are now able to generate KWOC author and subject indexes to our bulletins, which we could not do before. As the data base builds up, the retrospective search facility will become valuable. The cost of the ASSASSIN software is high in relation to our total budget, but we are hoping that other institutes in the ARS may follow our lead, in which case they will share the software costs.

At this early stage it is not possible to make a full assessment of the ICI system, but our impression is that it will meet our needs and enable us to provide an excellent service. In the course of four years many research workers have satisfied themselves that we are providing what they require and a steadily increasing number are now relying on us. Latterly we have acquired the equipment necessary to conduct retrospective searches using Lockheed (California), Blaise (British Library), and AGRIS (Vienna). The demand has quickly grown and the service is greatly appreciated. During the initial period the library budgeted to meet this cost. Now that the service is established we hope to pass on to project funding the costs of such retrospective searches.

ARCIS: an agricultural research current information system

Elizabeth Fell

Agricultural Research Council, London

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

Introduction

ARCIS IS AN information system holding titles, researchers' names and institutes, administrative codes, free keywords and costs for about 4,500 research projects sponsored by the Agricultural Research Council (ARC), the Ministry of Agriculture, Fisheries and Food (MAFF), the Department of Agriculture and Fisheries for Scotland (DAFS) and the Department of Agriculture, Northern Ireland (DANI).

In this paper the history of the system is described and some of the problems associated with classifying projects for administrative purposes are identified and illustrated. Finally, the future of the system is briefly discussed.

Origins of the system

In 1971 the ARC formed a small section for the strategic planning of research. As a first step, the staff of the section started to devise a project classification and information system to encompass all the research carried out in the agricultural research service.

The first system classified each project according to a small number of independent categories, chosen to provide management with the most scope. The number was deliberately kept to a minimum because of the limited computer facilities available at that time.

The categories were:

(a) Location of activity (*i.e.* which of the Institutes).
(b) Subject of research (*e.g.* pigs or strawberries).
(c) Object of research (*e.g.* growth or health).
(d) Method of activity (*e.g.* select best type of subject or identify and exploit the inherent qualities of subject).
(e) Discipline involved (*e.g.* chemistry or genetics).
(f) Type of research (*e.g.* applied or basic).

In addition, rough estimates of costs were made based on the scientist-years associated with the project. To illustrate all the systems, two projects have been selected. The first is concerned with measuring wind loads on plastic greenhouses to give designers more information and so help avoid the high level of storm damage which occurs to these structures at present. The second is

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CATEGORY	Wind loads on plastic greenhouses	Mildew and scab of apple and pear
SUBJECT OF RESEARCH	Plants	Top fruit
OBJECT OF RESEARCH	Prepare environment	Protect health
METHOD OF RESEARCH	To improve machinery and buildings concerned with the object	To identify, exploit or prevent the effect of micro-organisms on the subject
DISCIPLINE INVOLVED	Agricultural engineering	Pathology
TYPE OF RESEARCH	Applied	Applied

TABLE 1: *Project codings under the first system*

investigating the epidemiology of mildew and scab of apple and pear with the aim of achieving greater flexibility and economy in the spray programme. First system codings for these projects are shown in Table 1.

Although this classification was useful, it was found that the broad codings used were sometimes ambiguous, and adequate resolution was not always possible. This is well illustrated by the wind loads project and also by the fact that 41 per cent of animal research was included in the portmanteau 'method' category 'to identify and exploit the inherent qualities of the subject'.

The first revision of the system

A revised system was devised which still used the same approach but attempted to sub-divide the portmanteau categories and improve the overall structure of the system. The categories were grouped so as to:

(a) describe the agricultural situation relevant to the project;
(b) specify the action taken on that agricultural situation;
(c) define the nature of the benefit which would result.

The keystone to this coding was the agricultural situation. It was described in terms of:

primary and second inputs;
the agricultural plant or animal involved;
primary and secondary outputs from the plant or animal.

A flow diagram helps illustrate how this worked (Figure 1) and examples of the codings in each category are shown in Table 2.

The system illustrated in Table 3 defined the first project much more precisely. It is shown as a project aiming to improve the safety of glasshouses in certain climatic conditions. Despite the obvious improvement over the original classification, there were still many problems. Codes could appear in a number of different fields or in none at all. There was not necessarily a unique way of coding each project and, in practice, the categories were interpreted differently by different people.

Whereas the initial emphasis was on classifying projects, it was now becoming more important to be able to retrieve projects which fulfilled certain criteria. If

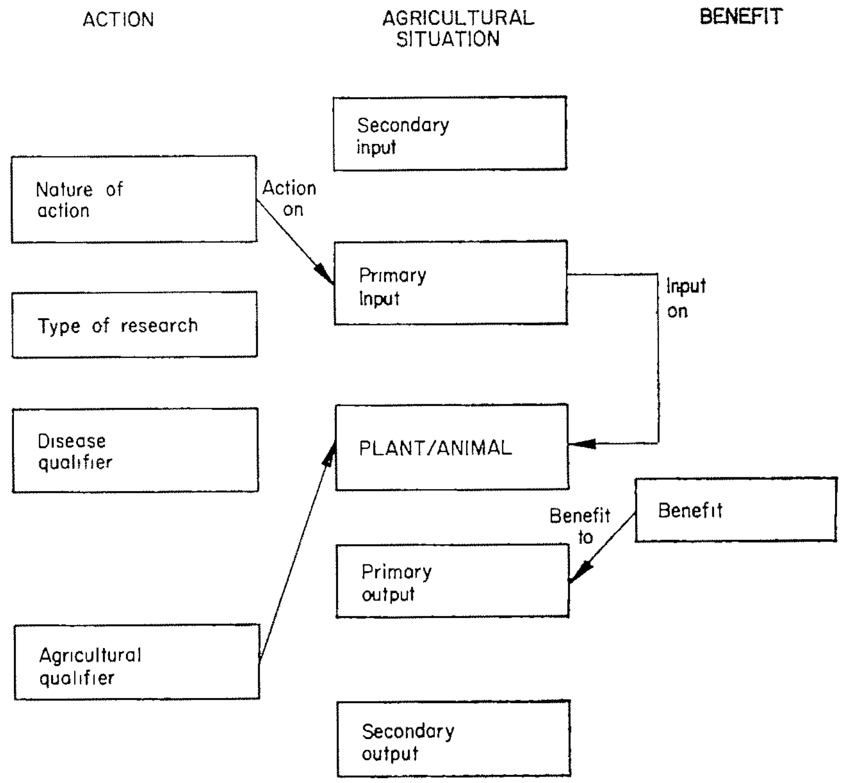

FIG. 1. *Flow diagram illustrating the first revised system*

CATEGORY	EXAMPLES OF CODINGS
NATURE OF ACTION	Breed; Find best; Inherent qualities (anatomy); Inherent qualities (behaviour)
TYPE OF RESEARCH	Applied; Fundamental; Strategic
DISEASE QUALIFIER	Foot-and-mouth; Scrapie; Disease in general
PRIMARY/SECONDARY INPUTS	Fungicides; Diet; Weeds; Climate; Machinery; Glasshouses
PRIMARY OUTPUT	Crop; Forage; Offspring; Eggs; Milk
SECONDARY OUTPUT	Bacon; Cider; Butter; Food
BENEFIT	Cost reduction; Yield; Quality; Safety

TABLE 2: *Examples of the codings used in the first revised version of the system*

CATEGORY	Wind loads on plastic greenhouses	Mildew and scab of apple and pear
PLANT/ANIMAL	Plants	Top fruit
SECONDARY INPUT	Climate	—
PRIMARY INPUT	Glasshouses	Fungus
INPUT ON	Plant/Animal	Plant/Animal
PRIMARY OUTPUT	Crop	Crop
SECONDARY OUTPUT	—	—
AGRICULTURAL QUALIFIER	No qualifier	No qualifier
DISEASE QUALIFIER	No disease	Disease in general
NATURE OF ACTION	Design buildings	Control adverse factor
ACTION ON	Primary input	Plant/Animal
TYPE OF RESEARCH	Strategic B	Strategic A
BENEFIT	Safety	Yield and quality
BENEFIT TO	Primary input	Crop

TABLE 3: *Project codings under the first revised system*

the system was to be of use as a management tool then this retrieval had to be 100 per cent accurate, reproducible and free from anomalies. It was impossible to meet these conditions on every occasion.

The second revision of the system

This version was used for longer than the previous systems. 'Intermediates' and 'Qualifiers' (to the Intermediate), 'Agricultural operations' and 'Justification' were all added in an attempt to sub-divide still further and classify projects more precisely. In practice these new categories were often found difficult to code and did not prove as useful in retrieval as had been hoped. The two projects used as examples for the codings are shown in Table 4.

CATEGORY	Wind loads on plastic greenhouses	Mildew and scab of apple and pear
PLANT/ANIMAL	Glasshouse crops	Top fruit
OUTPUT	No output	No output
INTERMEDIATES	No intermediate	No intermediate
AGRICULTURAL OPERATIONS	Glasshouse production	Plant production
QUALIFIERS	No qualifier	No qualifier
DISEASE	No disease	Fungal disease
JUSTIFICATION	Overall	Overall
PROTECTION/BROAD ACTION	Climate	Microbes (protection)
NATURE OF ACTION	Effect of atmosphere/wind	Epidemiology
SUBJECT OF ACTION	Glasshouses	Fungi
RESEARCH TYPE	Strategic B	Strategic A

TABLE 4: *Project codings under the second revision*

ARCIS

At the same time as the information system was being developed, administrative changes were also underway. Lord Rothschild had produced his report on Government research and development and as a result, about 55 per cent of ARC research was eventually to be commissioned by the MAFF. This research had to be identified, classified and costed. The commissions and sub-comissions were built up from projects within research topics using the experience gained with the early information systems. ARCIS uses the commission code, and one or two related ones, as an administrative group, and three management keywords describing the nature of the research activity, the commodity with which the project is concerned and the agricultural area to which the project is relevant. It is now possible to use one or more of these codings for almost all retrieval exercises. However, in addition to those keywords, and replacing the 'qualifiers', etc. of the previous system, there are up to sixteen free keywords taken from a thesaurus containing about 2,000 words, and these allow retrieval on a wide range of precisely defined project topics.

The agricultural commodity code in the management keyword group includes the Plant/Animal field of the previous systems but has been extended to include outputs such as cheese, cider, wool, for projects where the work is on the output.

The other two keywords tend to work as a pair. Thus the agricultural area may be crop protection, but the research is:

crop husbandry (*e.g.* field trials of a pesticide), or
plant breeding (*e.g.* breeding for disease resistance), or
engineering (*e.g.* design of sprays).

Alternatively the research may be engineering but the agricultural area is:

agriculture in general (*e.g.* design of tractors), or
soil (*e.g.* development of irrigation equipment), or
waste disposal (*e.g.* development of slurry-treatment equipment).

Coding for the two projects which have been used to illustrate the systems

CATEGORY	Wind loads on plastic greenhouses	Mildew and scab of apple and pear
TYPE OF RESEARCH	Strategic B	Strategic A
RESEARCH ACTIVITY	Engineering	Plant protection
AGRICULTURAL COMMODITY	Protected crops	Top fruit
AGRICULTURAL AREA	Agriculture in general	Crop protection
FREE KEYWORDS	Plastics Glasshouses Wind Pressures Design Loadings	Epidemiology Spraying Climate Spores Mildew Scab Apples Pears Yield

TABLE 5: *Project codings using ARCIS*

is shown in Table 5. Much more information is now held about each project, and this is particularly noticeable in the case of the wind loads project.

In parallel with the information system, a project costing system was also developed. Recurrent and capital costs of each project are updated every quarter and this data is held on both systems.

In addition to research projects in ARC Institutes, details are also held of projects carried out in institutes, colleges and organizations funded by the MAFF, DAFS and DANI. Thus details of most of the publicly funded UK agricultural research are now available through ARCIS.

Most of the retrieval called for uses only the administrative or management keywords, but it is possible to use the free keywords to great advantage. For example, a search on the word 'plastics' would produce six projects:

1. Root environment control in glasshouse tomato production.
2. Wind loads on plastic greenhouses (the example used).
3. The use of flexible plastic films for tunnel houses.
4. Fuel conservation in protected crops.
5. Migration of plastic constituents into food.
6. Flower and vegetable production in plastic tunnels.

It is especially interesting to note that these projects are being carried out at five different centres for three separate sponsoring organizations.

Future development

Possible developments to the system are being discussed, indeed, some are already underway. It is important to remember that what works today need not work tomorrow. Research is by its very nature dynamic, and so any attempt at its classification and retrieval must also be dynamic, while kept within a stable framework. Some of the changes being considered are:

1. The use of additional administrative keywords to identify projects which should be included on other research registers or to cross-reference projects to more than one commission.
2. The development of an interactive system which would allow users direct access to the data base.
3. The inclusion in the data base of project descriptions and details of associated publications.
4. Extending the availability of the information we already supply input on UK research to AGREP.
5. The inclusion of all government funded agricultural research in the data base. This would entail adding details of some further work sponsored by the MAFF plus all the research carried out in the universities and agricultural colleges.

It is clear that this description is of a system which is more than just the administrative tool it originally set out to be. But it is important not to get carried away by the technical possibilities without considering very carefully who the potential users of the data base might be and what information they will require. The right answers to many questions must be found in the coming months.

A system for the storage and retrieval of field trials data

A. Johnstone

Shell Biosciences Laboratory,
Sittingbourne Research Centre

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

Introduction

THE SHELL SYSTEM was originally designed to provide performance data on pesticides through research and development phases for marketing purposes.

The data base was stored on magnetic tape and searching was carried out using Assembler programs on a Univac 9300 computer. This system was adequate for its initial concept (*i.e.* to print out the stored field trials results) but development was curtailed by the limitations of the 9300 computer.

The data base was therefore transferred to a Univac 1110 computer and new programs were written in Fortran.

The opportunity was taken to provide access for other potential users (*e.g.* the Statistics Unit), to expand the search facilities and to increase the range of output available. The operation of the system can be described under four main headings as follows:

1. Data recording

Data captured in the field by technicians is copied on to recording forms designed around the eighty column format. The forms provide original copy of the experimenter's work and carry a mixture of textual information and data fields. The information and data resulting from a field trial are classified into four main categories, each of which has a separate form type to be completed:

(a) Experimental details, including plot dimensions, planting density, crop identification, pest identification, dates of application, product details.
(b) Environmental details, including fertilizer, application, soil properties and conditions, weather conditions.
(c) Experiment design layout and location.
(d) Results of assessments.

The first twelve columns of each line on the forms are used to uniquely identify the records in subsequent processing. To avoid ambiguity in crop and pest identification the field teams are provided with cross-indexed lists which give six character codes for some 8,000 initial references. The codes are constructed to index pest family, genus and species, also crop variety. Instruction

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manuals for the completion of the recording forms are also issued to the field teams.

2. Data processing

The recording forms are sent to the Sittingbourne Research Centre where they are checked into a card index system which is used initially to locate any duplications in record identity. The forms are then checked visually for validity and to see whether or not they conform to the broad requirements of computer processing before being passed to on-site agronomists for final validation. At this stage the contents of the forms are keypunched to cards and updated to the main data base which is kept on Fastrand mass storage on a Univac 1110 computer. The updating procedure incorporates a syntax check and duplicate record check whereby any records in error are rejected before merging takes place.

3. Data storage

The records are stored as card images on disc and their location is initially indexed by type of trial and year in which the trial was carried out. Subsequent indexing is sequentially by country and trial number within country.

4. Data retrieval

Keywords are used to define sections of interest within a trial and associated parameters are used to constrain the search for those trials with the values given.

There are fifty keywords which cover all of the experimental detail section, fertilizer application, soil properties and assessment details.

Two types of printed output are available: the first is simply a distribution table of the number of trials which match the profile requested. The other is a detailed print of all the results stored for each of the trials found. Options are available to limit the second type of printout to only those sections of trials that are of interest to the user.

Other options are available which allow the user to create a mini data base using the trials found which may be used either for further, more specific, searches or as data input to statistical analysis programs.

Dimensions of the system

The first trials data were computerized in 1968, and to date more than 800,000 records representing some 8,000 worldwide trials have been added. The current rate of updating is more than 1,000 trials per year.

A team of seven personnel is involved in the day-to-day operation of the system and consists of four keypunch operators, two data checkers and one section head.

ESCA information awareness and retrieval service

N. B. Lilwall

The East of Scotland College of Agriculture

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

ESCA AWARENESS AND retrieval service deals exclusively with the 'intermediate' agricultural literature—that is the literature falling between the popular weeklies and the academic journals. It includes such publications as ADAS *Quarterly Review*, *Arable Farming*, *Midland Bank Review*, leaflets and bulletins from MAFF and the Scottish Colleges, and annual reports from research establishments.

The system currently contains over 4,500 items and is updated monthly. Each item is assigned several keywords and it is through these keywords that references are sorted and retrieved.

Three main services are provided by the system. There are the monthly *advisory* and *specialist indexes* which form the basis of the awareness service, and there is the monthly *serial listing* which forms the basis of the retrieval service. Both the indexes and the listings contribute to a third service which is that of *subsystem servicing*.

The information system as a whole is easy to operate, cheap to run and extremely flexible; and the output is in the form of easy-to-read computer printouts.

Awareness services

The current awareness services can be tailored to meet individual needs. At present there are four monthly advisory indexes and fourteen monthly specialist indexes available. Each index covers a specific area as determined by the keywords used in its selection.

Retrieval services

There are two ways in which the system may be searched so that references may be retrieved. In both cases the user must define his requirements in terms of the keywords or combinations of keywords used by the system.

The search may be broad or specific. Use of the keyword *cereals*, for example will retrieve all items referring to cereals in general and all items referring specifically to barley, maize, oats and wheat. The keyword *barley* can be used if only this particular cereal is of interest.

Normally a user of the system will wish to use a combination of keywords to narrow the search to particular aspects of, say, crop or animal husbandry. Thus

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for information on sheep breeding the user would simply use *sheep* and *breeding*; for information on the effects of nitrogen fertilizers on grain quality in barley the user would use *barley*, *nitrogen* and *quality*.

i. *Phone-in system*. This is the most popular retrieval system. It depends only on the user having access to a copy of the serial listing book. The procedure for using the system is as follows:
   a. Prepare a search request in the form 'May I have a list of all entries containing the keywords *beef* or *dairy* and either of the keywords *rearing* or *fattening*.' As many keywords may be used as desired, but they must be selected from the standard list. Increasing the number of keywords to be used as alternatives, will increase the number of items retrieved; increasing the number of keywords or lists of keywords to be used in combination will reduce the number of items retrieved.
   b. Telephone the request to the Edinburgh School of Agriculture library
   c. The librarian will telephone back, within a few minutes, with a list of entry numbers.
   d. Look up the entry numbers in the serial listing to get the publication references relevant to the original enquiry.

ii. *Direct retrieval*. Arrangements can be made, for anyone with access to the Edinburgh Regional Computing Centre's EMAS system, to conduct searches directly. All the material is held on file in this system and facilities are available for online or overnight (cheaper) searches.

Sub-system servicing

This is one of the under-utilized aspects of the system. There must be great scope for using both the monthly serial listings and the indexes as input material for local retrieval systems.

At present one county office uses the serial listing to update an optical coincidence system and one department uses a specialist index to provide material for a card-index system.

Utilization

At present about thirty-five serial listing books are being maintained in the UK. Most of these are in libraries but some are held by individuals. About 100 retrieval requests a year are being handled.

In addition, about 220 advisory and specialist indexes are mailed out to seventy individuals each month, mainly to staff in the North and East Colleges.

Cost and charges

The system is relatively cheap to operate and at present all services are provided free to government and university staff. A £25 charge is made to commercial firms.

Agricultural information services in ICI

J. A. Silk

Technical Information Section, ICI Plant
Protection Division, Jealott's Hill
Research Station, Bracknell

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute, London, 3 May 1978

THERE ARE TWO aspects I should like to cover: Firstly, the general extent of ICI'S interests in agricultural information, and secondly, the details of the range and relationships of the information services in Plant Protection Division.

ICI's interests in agriculture are shared among three Divisions. Agricultural Division has been manufacturing fertilizers for over fifty years and in recent years has developed single cell protein for use in animal feeds. Our Pharmaceuticals Division deals with veterinary products, and Plant Protection Division is concerned with crop protection and public health.

The original agricultural information service, which covers both crop and animal production, goes back nearly fifty years, and its methods can show a progression firstly, from traditional card indexes with abstracts, filed according to the Kaiser system of subjects and process terms, then to a simplified Kaiser system with a number of references on cards each representing a process term, next a peek-a-boo type of co-ordinate index, and finally KWIC indexing with stylizers—to separate the major categories of terms, such as crops and chemicals. These last two were designed mainly to provide temporary indexing until the appearance of printed indexes to CAB abstracts. Nowadays, this is no longer necessary with the advent of on-line services, and with a much-reduced staff we concentrate our efforts on the more skilled task of enquiry answering. Current awareness on technical publications is provided entirely by SDI profiles on Chemical Abstracts and ISI tapes and by circulation of *Current Contents*. An ASSASSIN system is used, however, for techno-commercial information, over the whole range of the Division's interests and this provides both SDI and retrospective search.

In Pharmaceuticals Division an ASSASSIN system is used for recording publications on the Division's own products in both the human and animal health fields, and a major product of this service is a series of computer-typeset profile bulletins, four of which deal with veterinary matters. Papers for inhouse abstracting are selected by a combination of methods. Scanning primary journals and *Current Contents* provides the majority, while SDI profiles on various tape services (not including CAB) bring in the remainder. (This operation is appropriately known as Sweep-up!)

Turning now to my own Division, the starting point for new products is the screening of literally thousands of compounds a year for relevant biological

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activity. This is much like pharmaceutical research. A majority of compounds come from within ICI but a good deal of effort also goes into acquiring them from commercial suppliers, universities and other chemical companies not in our line of business.

The structures of all these compounds are registered in the Company Compound File using the Wiswesser Line Notation, and the file can be searched both for individual compounds and for structural classes of compounds using the CROSSBOW system.

Screening the compounds produces a mass of simple biological data which is recorded in another computer file known as BCDF. This can be searched for patterns of activity against particular organisms, and these results can be combined with those of chemical structure searches, so as to assist chemists and biologists in the correlation of structure and activity.

The compounds which are active in glasshouse tests are synthesized in larger quantities and sent for field screening and preliminary toxicological testing. Those which continue to show promise then go for field trials in appropriate parts of the world, and if early trials and toxicology data are sufficiently promising, a development project team is set up. The team leader then has the responsibility of co-ordinating all the lines of work required to develop a new product. These are shown in Figure 1. Most of these—the first seven, to be exact—refer to internally generated information, which is recorded in company reports; the remainder are dependent on published information.

1. Chemical synthesis and formulation
2. Application methods
3. Biological efficacy:
    - pest species
    - crop varieties
4. Residue analysis
5. Metabolism and mode of action
6. Toxicology
7. Environment
8. Patents
9. Market potential
    - outlets (crop/pest/country)
    - competitors

FIG. 1: *Project teams' information needs*

All our technical reports are indexed by information officers into our ASSASSIN system. The usual bibliographic details plus a short abstract, giving quantitative data on rates of application, etc., where appropriate, are recorded, together with any further index terms which may be useful in retrieval but do not occur in the title or abstract. Input to ASSASSIN automatically generates index entries for all the terms which are already in the thesaurus, and a list of these is printed out for the system controller to check, if she wishes. Words which are not recognized are printed in a 'new words' list, and the controller then decides whether to add them to the thesaurus, either as new terms in their own right or as synonyms of existing terms, or simply to ignore them. New terms may also be posted up to generically related terms, and this posting then takes place automatically on each subsequent hit. Terms are also assigned a word-type tag, such as crop, chemical, insect, weed or general terms.

In addition to internal reports, we also index into ASSASSIN published papers on our own products and any which are regarded as important competitors.

From ASSASSIN we generate five forms of output. The first consists of *bulletins*, one for published information and another for reports. These include abstracts, which reduce the number of requests for full copies of the original, and they are in the form of photoreduced computer printout—arranged in two columns vertically on A4 sheets. We believe that by paying attention to 'cosmetic' details of layout and by taking care to ensure good quality reproduction the bulletins are acceptable to our readers without the greater cost and delay involved in using computer typesetting. And, of course, we are saving the duplicate typing which used to be entailed, when ASSASSIN input was a separate operation. The literature bulletin also contains a supplement made up of photocopies of short news items plus some short typed entries of only ephemeral value. These are important to many of our readers and they are not covered by conventional abstract services.

Next, we produce a small number of *SDI profiles*. Most of our readers, however, especially those overseas without easy access to a library, prefer a complete bulletin to scan rather than the more specific coverage of profiles.

We produce *KWIC indexes* of report authors and titles for use in our report centres. These are intended for document retrieval rather than information retrieval and they take the place of conventional card indexes. KWIC is not a part of standard ASSASSIN. We programmed the link ourselves.

We also produce *KWOC indexes*, which *are* a standard feature, but we don't make much use of them, except for producing the subject index to library books and pamphlets. A KWOC of all terms in the database runs to thousands of pages and we produce an annual one on COM fiche as a back-up search tool in the event of a major computer failure. Normally, our *searches* to answer specific enquiries are run on a daily basis through local terminals; this a batch-mode operation, not online, and usually it runs overnight.

It may be of interest to know that the data preparation for input is carried out on small VDUs connected to our local Data 100 terminals. Input is stored locally on disks and transmitted in daily batches to a holding file on the IBM 370 installation at Agricultural Division. There it is held in readiness for the fortnightly ASSASSIN input run. Previously, we have used both punched cards and OCR typing, but there is no doubt that VDUs are far superior, because of the ease of correcting errors and the prompts which they provide to the operators.

You may realize from what I have said that we do not operate a system for recording details of individual trials. We only have retrospective indexing of final reports. Field trials are designed and analyzed by our Statistics Section, and in our view it is the overall assessment contained in a report that matters; bare figures can be misleading if they are interpreted by someone else who did not carry out the work. However, with the growing demands of the EPA in the United States for detailed recording and retrieval of all experimental work, we are having to look more closely at this aspect.

There are the three areas of published information which a project team requires: patents, techno-commercial data and competitive products. Crop protection research is highly competitive and good leads to new classes of active compound are not easily found. Firstly, therefore, it is essential to obtain the protection of a patent when a new class is discovered, and secondly, it is important to know in detail what has already been patented. Once the importance of a new product becomes known to others in the business, they frequently start up research around this area, and this can lead to extensive 'me-too' patenting. This may be just imitative or it may result in compounds with merits of their own, such as greater selectivity. Like all chemical companies nowadays, we rely on the services provided by the Derwent organization for both current awareness and retrieval. We operate a separate ASSASSIN system for searching the Agdoc file, but the trend is increasingly towards online searching.

For assessing the market potential of new products, statistical and economic information on crop acreages and problem incidence is important. This is handled by our Business Environment Department. Information has to be gathered from a variety of sources ranging from newspapers to major compilations by market survey organizations. In many cases it can be obtained only by visiting the countries concerned. The forms which it takes are varied and at present only a small part is available in computer-readable form.

Lastly, but by no means least, is information on other manufacturers' products. This too comes from a variety of sources—conferences, journals, manufacturers data sheets and personal contacts—and it covers a range of aspects from chemical structure to practical application. A traditional filing system and card index meet the need best, but for quick reference to trade and common names, code numbers, uses and manufacturers we find KWIC indexing to be very convenient. Each significant word in a line of up to 120 characters is automatically permuted to form an entry, and the package is easy to maintain and uptade. Photo-reduced copies can be distributed for desktop use. We use the Multifile KWIC system and this enables us—through class codes which form part of the accession number of each entry—to produce subsets for particular interests, such a single one on fungicides or a combined one on insecticides, acaricides and nematicides.

This then covers most of the services which we need to operate in the crop protection business. In summary, I might refer to the systems as A, B, C and K: A is for ASSASSIN for textual information. B is for BCDF for numeric screening data, C is for CROSSBOW for chemical structures and K is for KWIC and KWOC which find various applications.

Finally, on the broader field of technical literature, we have always made extensive use of the printed form of CAB abstracts, and since they became available online, we have found a growing use for this method of searching. The avilability of abstracts online makes CAB more attractive than Agricola, Although CAB costs more per hit, we reckon that it is cost-effective overall, because it saves staff time in looking up references and photocopying them.

A review of information research in agriculture

Gillian Craig

Agricultural Extension and Rural Development
Centre, University of Reading

Paper presented at the Aslib Biological Group Meeting, Tropical Products Institute London, 3 May 1978 .

AT THE AGRICULTURAL Extension and Rural Development Centre (AERDC) in the University of Reading, work has been in progress on a project entitled 'A Review of Information Research in Agriculture'. The project, which ran from October 1976 to September 1978, is one of a series of reviews of information research in selected sciences supported by the British Library Research and Development Department. Other reviews have been in the fields of physics, chemistry and biology.

All four of these reviews have been undertaken along similar lines. The project work was conducted by a Review Panel, which acts as an advisory committee and meets periodically, approximately every three to four months. This Panel is assisted in its work by a full-time Research Officer, who acts as secretary to the Panel, collects and analyzes relevant background material and prepares working papers and reports for meetings. The Panel has fifteen members, including its Chairman, Mr G. E. Jones, and the Project Director, Mr M. J. Rolls, both from the AERDC. The Panel members are individuals with varied job specifications and experience of information provision and use; nine are essentially information users, while six are agricultural librarians or information scientists. A range of agricultural organizations is also represented on the Review Panel and this has led to a significant diversity of interests and points of view.

The main aims and objectives of the Review are:

(a) to identify and evaluate specific studies or research on agricultural information, relevant to the UK;
(b) to consider critically what is already known about the production, dissemination and use of information by agriculturists;
(c) to identify areas of concern and assess needs for research and development work in agricultural information;
(d) to devise research projects which may lead to improved information provision for UK agriculturists.

The main focus of the project is on the information available to agriculturists, the information required and used by agriculturists, and the information flow

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between agriculturists. In the project, agriculturists are defined as individuals who, by nature of their job specification or main function, service the agricultural activities of farmers (*i.e.* the production of crops, animals, and animal products), either directly or indirectly. This includes research scientists, specialist and general advisers, teachers at universities and colleges teaching agriculture, graduate personnel in agricultural industry and commerce, agricultural administration and information work. Such agriculturists work in the service sectors of the agricultural industry as opposed to the production sector.

At the early proposal stage, it was decided to exclude from the project all forms of information flow directly between agriculturists and farmers. The areas of forestry, fisheries, food science and veterinary science were also excluded, and agriculture which included horticulture was loosely defined as 'the scientific, technical, economic and social aspects of those operations which take place within the farm gate'. In the early Panel meetings there was much discussion about the proposed coverage of the Project. In practice, however, in spite of the exclusions, the scope and coverage have proved to be very broad.

The major part of the work of the Panel has been concerned with the first three objectives listed above, but time has also been spent considering worthwhile proposals for future research on agricultural information.

When identifying and reporting on past and current work in the field of agricultural information research, difficulties arose because of the 'non-conventional' and internal nature of many publications documenting agricultural information research. Since there is no co-ordinated research programme for information research in agriculture, it has been necessary, in addition to undertaking a conventional literature review, to rely on identifying projects through personal contacts. Furthermore, much of the relevant work in this field of study is still in progress. Only a comparatively small number of research projects have been identified by the Panel and these are restricted to fairly narrow and specific topics. For these reasons, the Panel was unable to obtain a realistic over-view of the UK agricultural information scene merely from a review of information research.

Early in the project it became evident from discussions between members of the Panel and with individuals outside the Panel that, in most cases, UK agriculturists, including those concerned primarily with information, know very little about the current provision and use of information in agricultural organizations other than their own. For this reason, much time had to be spent, as back-up to the review of research, gathering general background information on the activities of the range of organizations and individuals who are concerned with agricultural information. This information has been obtained from three main sources: firstly, from Panel members, who contributed information about their own organizations; secondly, by two circular letters, one to fifty-one organizations, primarily marketing boards and similar authorities, trade associations, learned societies, banks, etc., and the other to forty-two colleges teaching agriculture; thirdly, from informal discussions between the Research Officer and a large range of individuals working in organizations not directly represented on the Review Panel.

Topics discussed in Panel meetings have been very broad-ranging, but fall into the following main areas:

(a) the many agricultural organizations with different information interests, activities and resources;
(b) the information-gathering habits and problems of various categories of users, particularly advisers and teachers;
(c) the different types and forms of presentation of agricultural information, and methods of information dissemination to potential users;
(d) users' knowledge of and accessibility to information resources already available;
(e) secondary documentation services and information retrieval systems, including the major services such as those of the Commonwealth Agricultural Bureaux, the Agricola service of the National Agricultural Library, Washington, and the FAO AGRIS (International Information System for the Agricultural Sciences and Technology) service, as well as certain inhouse systems such as those at the East of Scotland College of Agriculture and the ADAS Worcester Divisional Office (here it was apparent that provision of information retrieval systems in scientific sectors was better than that in technical and advisory sectors);
(f) user education;
(g) the functions and roles of agricultural librarians, and information scientists.

The Panel's investigations and discussions have enabled some of the strengths and weaknesses of the agricultural information system, as a whole, to be identified, as well as areas where there is insufficient knowledge of the system for judgment to be made. Some areas of concern and issues which appear to merit further investigation are as follows:

(a) the lack of a comprehensive and up-to-date directory of agricultural information sources in the UK;
(b) the lack of sufficient detailed knowledge of the information-gathering habits and problems of different agriculturist users;
(c) the need for more review articles;
(d) the effective communication of agricultural research and development results;
(e) the bibliographic control and accessibility of agricultural literature excluded from the major databases (especially extension literature, 'popular' literature, pamphlets, many reports, UK theses, current research, and conference proceedings);
(f) the apparent lack of knowledge of important information tools, systems and services on the part of many agriculturist users not directly concerned with information work;
(g) the relative shortage of professionally trained librarians and information scientists in agricultural organizations;
(h) the absence of a national forum for discussion of agricultural information issues and developments.

The last phase of the project was concerned with devising worthwhile research and development projects to recommend to the British Library Research and Development Department. It was anticipated that the work would be completed by the end of September 1978, when a Final Report would be submitted to the British Library.

Notes

TWO PAPERS PRESENTED at Session Two of the Aslib Biological Group Meeting were not available for publication at the time of going to press.

M. G. Howes described the information services provided to the Agrochemical Division of Fisons Ltd.

Patricia Wortley outlined a study undertaken at the Centre for Overseas Pest Research.

It is hoped that both these papers will appear in future issues of *Aslib Proceedings*.

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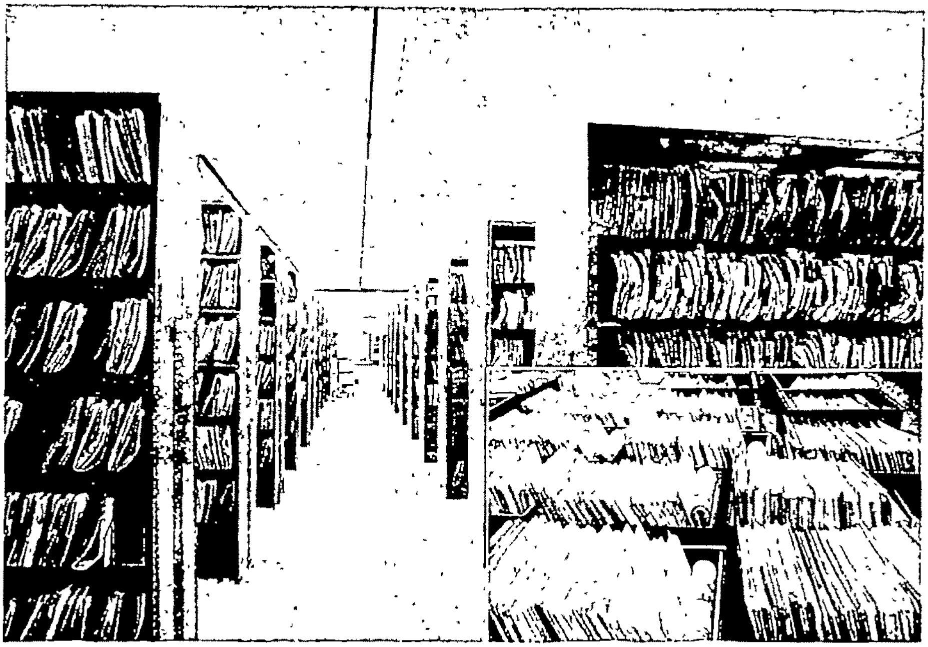

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Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, Kathleen Gray, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

Future perfect

Wilfred Ashworth

Chief Librarian, The Polytechnic of Central London

Paper presented at the 11th Aslib Annual Lecture at the Royal Institution, London, 22nd November 1978

CONSIDER THE MEANS available to us for enjoying a piece of music, such as this, which I am about to play, Tchaikovsky's *Marche Slave*—a cassette recording made on a machine costing £10; an EMI studio tape played through equipment costing £3,500, or better, through £8,000 worth of stereo or quadrophonic equipment; or even a live rendition by the London Philharmonic Orchestra at the Royal Festival Hall. If you were to compare these versions of Tchaikovsky, what you would experience is a quick and simple demonstration of the law of diminishing returns: As each step towards perfection is taken, costs escalate dramatically. Now this law happens to be universally applicable and stands squarely in the way of man's innate desire to attain perfection. The urge towards perfection is so powerful that the law, acting as an unwelcome barrier, is usually either deliberately ignored or conveniently forgotten. Your hi-fi enthusiast, for example, continues to pore over equipment specifications and buys bigger, more sophisticated and costlier items regardless of the facts that his small lounge will not accoustically fit a thirty-two-foot organ pipe and that unless he is young he cannot hear notes above seventeen or eighteen kilohertz. How many of you, I wonder, would realize it if the studio recording of *Marche Slave* had been rolled off by EMI at fifteen kilohertz? Certainly I could not detect it, nor could anyone else above the age of fifty-five. So why strain so hard for perfection? Indeed, why bother?

And this is not a defeatist attitude but an entirely fair question because money is being squandered to no effect. Yet it is a question people prefer not to face as they doggedly persist in pursuit of a perfection they cannot enjoy and, in fact, do not need. Also anyone who adopts a more realistic approach is liable to condemnation as lacking in idealism because he has decided not to reach out for the unattainable and unnecessary. The common attitude is that bigger, more sophisticated and more expensive must *surely* be better? It stands to reason, or what we would like to believe is reason.

It so happens that librarians are amongst the most committed of idealists, understandably so because librarianship is a profession dedicated to the service of others. But selfless service is frequently blinkered. Classically librarians have developed a series of canons and romantic principles which have been believed for so long that they are now regarded as axioms. Included amongst these is the widely-held concept that everyone has a basic right of access to all knowledge. The intensity of feeling behind this belief has caused librarians blindly

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to adopt a pan-acquisition policy and to aim for universal bibliographic control. It has led them to think of a perfect library (or library system) as one which would contain *every* item of published knowledge bibliographically organized for uniformly easy retrieval and use.

The information explosion proved tremendously traumatic to such librarians. There was an alarmingly accelerated rate of growth of publication which was, even before this, already causing storage problems in libraries. Bibliographic control became enormously complicated because the new knowledge of the scientific revolution began to be transmitted in a different way. Instead of monographs as formerly, information was packeted in small units such as reports and pamphlets, and as articles in periodicals. Simultaneously users demanded more of libraries and expected from them not just documents but the information those documents contained. Every single library dimension increased considerably but the total effect was staggering because it was the product, not the simple sum, of those changes in dimension.

Reluctant tribute must be paid to the tenacity of classical librarians who have held to their faith while their universe has been crumbling. Their argument ran like this: The growth of scientific knowledge created problems. Science appears to be all-powerful. Advancing technology can therefore be expected to solve the problems it has caused. Superficially this is all very reasonable, because we live in an age in which we have achieved so much. We can look down on our world, physically, thanks to space fight photography, which gives an immense sensation of supremacy and the conviction that we are able to control any earth-bound situation. Our mental and material resources are vast and it is within our powers to turn them to whatever end *we* choose. We are *homo sapiens* remember. Therefore, whatever we need we are capable of supplying. Access to knowledge is a vital need so resources ***must*** be found to support it. We can pull down our barns and build greater—witness the St Pancras building of the new British Library replacing the old reading room in the British Museum—and are there not also machines to which we can turn? My own limerick might here be appropriate:

As far as I understand Blaise
It is only an in-between phase
For Medlars with Marc
To enjoy for a lark
Before Merlin with Wizard displays.

In 1946 my own university, the University of Manchester, built the world's first computer, Mark I. Thirty-two years later we can squeeze more computing power than the largest valve amplifier ever built into a space of $2\frac{1}{2} \times \frac{1}{2}$ inches, while the active part of *that* device can be threaded through the eye of a needle: Not only in our restaurants is it now 'chips with everything'!

Every few years we herald what is announced as a 'new generation' of computing. No wonder that Licklider, in his *Libraries of the Future*, predicted that computer technology would grow faster than the increase of knowledge. He also looked forward with confidence to a time when, in spite of exponential increases, we would be technically capable of processing the whole body of existing knowledge in almost any way we could imagine. What wishful thinking we indulge in! King Canute's flatterers had much the same attitude because they, too, did not understand the nature of the powerful forces they were up against. Yet how near to success they were! If only they had positioned his throne above, instead of below, the tide-line, his kingly command would have been obeyed! I hope to show that the stand librarians have so far taken is similarly misguided, and I hope also to demonstrate that a simple adjustment of *their* position would lead to success. Librarians and the users of libraries still seem to believe that the *tide* of knowledge is destined to advance inexorably and that the *growth* of knowledge will continue to be exponential.

Fortunately this is not, and cannot be true. In any real-life situation continued exponential growth is impossible. A given amount of energy will support the system for shorter and shorter periods, in a diminishing returns manner, the closer infinite size is approached. Ultimate failure is bound to occur. In my professorial lecture to the Polytechnic of Central London I made a detailed study of the information explosion beginning with examination of the fundamental principles of growth and their consequences. I do not propose this evening to repeat the arguments which are available to you in the *Library Association Record* for April 1974, but my general conclusions are important and relevant to consideration of future libraries. Knowledge, in *its* growth, must obey the universal laws which prohibit the continuance of any form of exponential increase towards infinity. The process must inevitably slacken off and approach a saturation level. This occurs where the amount of activity in the system is equal to the resources available to support it. The true growth curve in any real system which requires an input of energy is logistic, not exponential. Isn't anyone going to applaud? What I have just said should be good news to you, offering as it does the salvation of librarians.

Unfortunately, in any situation under human control, and for the perfection-seeking reasons I have given earlier in this lecture, there is marked reluctance to accept flattening of growth curves. Humans hate being forced to face the fact that the systems they have set up cannot grow indefinitely. And in this case, sadly, librarians are *all* too human! The point I have tried so often to drive home to my colleagues in the library world is that the resources globally available to support the information transfer process are *finite*.

Attempts to increase the scale of any operation beyond the point where it significantly enters the region of rapidly-diminishing returns, and begins to absorb a disproportionate amount of effort, are doomed to failure. Why will nobody acknowledge this? The Hague/Science Library attempt to create a world index of scientific articles was a case in point. IFLA's present plan for Universal Bibliographic Control will be another. When it does fail it will, of course, all be explained away as due to the difficulties of international co-operation. Nobody will admit that it proved too expensive to be worth doing in the first place.

There is a good deal of evidence that the information transfer world has already passed the point of inflexion in the logistics curve and that we are moving near to the saturation level. It is already becoming much harder to obtain adequate financial support and manpower to maintain libraries in their attempts to house all the world's literature. We have experienced, with some surprise, a decline in the effectiveness of large collections, in spite of improved techniques in handling material. As long as the perfect library continues to be defined in a manner which takes it for granted that larger is better, because it offers users access to a greater proportion of what is known, the more trouble we shall have. Such a definition ignores the inherent reduction in efficiency which size brings with it when each item can only be found more slowly because it is amongst so many others. In such a situation there is diminishing return for applied effort.

All these factors are facets of the change from unrestricted increase of growth at the lower end of the logistics curve (which applied while librarianship was in its developmental stage) to the near-saturation of the present time. I believe that a totally different approach is needed now, with redefinition of what would be a perfect library in the new circumstances. Diminishing returns are a feature of saturation conditions, and resources are limited. It is therefore vital to eliminate wastage and define aims carefully in order to conserve those resources. The world is awakening to the realization that conservation of resources is priority number one for the future of its inhabitants. It is now time to alert librarians, information users and all others associated in any way with the transference of information that conservation of *their* resources is part of that same programme.

It is essential to tackle at the outset the absurdity of the librarian-and-user concept that access to all knowledge is necessary or even desirable. Its corollary, that once any information has existed it must never be allowed to die, is equally absurd. Information, like any other commodity, varies in quality and value. Indeed as de Solla Price demonstrated in his *Little Science, Big Science* as long ago as 1962, rapid growth conditions destroy quality. The more society rushes to focus attention on any one area the poorer will be the quality of work which emerges from it. This is because the introduction of more workers to an area induces a pyramid effect increasing the number at lower levels faster than at higher levels. So less good appointments are then made because there are not enough suitable people to fill the posts created. The price to be paid is a lowering of standards—of the workers and of the quality of their work.

This is a typical automatic compensation mechanism of logistic decline as the bottom of the barrel is scraped. The greater the rate of publication in any field the higher the proportion of poor quality material produced. Yet workers in the field, and the librarians who serve them, struggle to obtain access to it all. Librarians who collect literature indiscriminately share responsibility for the decline of standards and they waste further time by indexing the low-grade material. It would be far better to ignore it and force its death than try to keep it alive on the mistaken assumption that users are not properly informed unless they have completely comprehensive choice.

It is a fallacy that the total body of knowledge in the world must increase for ever. It can be demonstrated that some knowledge does, for practical purposes, cease to exist. That it can be shown to be dying faster now than ever before is further proof that logistic decline is occurring. The vast discrepancies in published estimates of the number of different periodicals in the world, reviewed by Davinson in his recently-revised edition of *The Periodicals Collection* and shown to vary between such improbable extremes as 15,000 and 3½ million, arise because no account has been taken of mortality of titles. In fact the mortality of titles has for some years now kept pace with new titles introduced. Despite all its endeavours, Boston Spa has been unable to enter subscriptions to more than about 50,000 current titles. Since most highly specialized journals now exist only because they are bought by libraries the mortality rate of serial publications is certain to rise even more rapidly as their costs of production increase. This will clearly be a Malthusian reaction to counter the period of unusually rapid birth-rate which occurred when we were in the lower reaches of the logistic curve. There is also an increased rate of book obsolescence as shown by Raymond Moss in *New Library World* for July 1978. He studied *British Books in Print* and the US equivalent *Books in Print* over a twenty year span in a science subject, in literature and economics. He found a uniform increase for all these subjects in the rate at which titles have gone out of print. These sources confirmed a rapid increase in publication but pointed to a parallel increase in obsolescence. In the three topics considered the number of books in print rose from 300 to 623 but of the original 300 titles only forty remained after twenty years. The situation is deteriorating. Publishers are reluctant under present economic uncertainties to risk large initial printings. Also they would rather cash-in on a new title than reprint an old slow seller.

I know my librarians, and, with such rapid obsolescence, small editions and lack of reprinting, they will no doubt argue that they ought, all the more, to keep all books on the shelves indefinitely. Otherwise they won't be available for readers' use. This is the classical librarian's typical reaction—my view would be quite different. These books, recently published, have quickly become obsolescent because they have not sold well enough to be kept in print. Why then try to justify the preservation of books which, by the wallets of the public, have been voted unwanted? To keep up with the rate of obsolescence librarians should undertake instead a correspondingly rapid process of weeding-out to maintain only currently-useful stocks. This, of course, runs absolutely counter to the viewpoint of most university librarians who recently reacted violently to part of the Atkinson Report. This part suggested that their libraries should become 'self-renewing'—in other words that they might be permitted to grow only to a certain size at which they would then discard older and superseded stock at roughly the same rate as they acquired new material. University librarians are so wedded to the idea that all knowledge must be retained, especially in the humanities, that they refused to accept that there could be superseded stock, and that knowledge could so far lose practical value that it would be uneconomic to keep it. This desire to retain everything just might, however, arise from a deep-seated fear of taking decisions. As we have already seen, many specialist periodicals, and expensive research monographs also, live only because they are purchased by libraries. So this life or death decision could, and in my opinion should, be taken by librarians. But if death decisions were made users would have to be reassured that they were in no way the losers.

And here I come to the most important feature of my analysis of the information explosion. I began by attempting to explain why the innovative process continues to flourish, and significant discoveries continue to be made simultaneously in widely separated parts of the world where access to the whole spectrum of available information is extremely variable. And it all happens in spite of the escalating cost and diminishing returns effect of making the comprehensive literature searches which are presumed to be needed. It seemed to me that the birth of discoveries is more dependent on the readiness of the time for them, or on a social climate in which they can successfully emerge as acceptable concepts, than it is on discoverers having access to all knowledge. Good ideas (if they are timely) take root and grow with persistence, spreading with surprising rapidity and quickly becoming a part of the current consensus of expert opinion.

I came to realize that a key and inherent feature of the global information pattern is that there is, at any given time, an active band of knowledge which is that part of the total corpus temporarily appropriate for the development of new ideas and creative progress. The logistic laws which control growth inevitably restrict the size and content of this active band according to the mental and material resources at that time available to work on it. The size varies according to the amount spent, by political decision. The content may also be affected by external circumstances such as deliberately forced or evolving changes of interest. But, at any point in time, the band has finite extent and within this its content is self-adjusting to change. Greater attention to one subject area and its growth would automatically reduce the resources available to others in the band and some might be displaced from it.

The theory does not exclusively apply to the transfer of information and bibliographical control in those countries which, because of high material wealth, can support sophisticated systems. It has equal validity to under-developed areas. In these, the active band is reduced by local limitation of resources. But this need not inhibit their inhabitants from making discoveries of relevance and importance to their own conditions. It is only their competitiveness with high-technology areas which suffers. The theory thus accords with recent findings that intermediate rather than high technology is more appropriate for their next stage in development. Under-developed countries do not need the full range of knowledge. They cannot use it. Indeed innovation can sometimes be impeded, and certainly can be discouraged, by access to too much information. Well-meaning aiding countries often fail to realize this fact. They cannot, for example, believe that satellite linkage to their most complex computerized retrieval services and rapid back-up loans facilities could prove a inhibiting embarrassment to progress. But it can, and does.

Once it is accepted that the Ashworth active band exists, as a natural outcome of logistic saturation conditions, then it is easy to understand how an excellent library and information service can be provided from a limited stock. There is no need to strain to beat the dreaded information explosion because it embodies its own controlling forces. We can now define a perfect library more realistically —and actually *attain* it with the resources we possess. There can be no point in collecting information which will not, or cannot, be used. So, at any particular time, librarians are not concerned with *all* knowledge (the unattainable goal) but rather with the task of collecting and organizing that *part* which is then in the active band. As I have said elsewhere the criterion for acquisition and organization for optimum effectiveness is that the number of copies of desirable material in (say) a nation's library system, and their geographical and retrieval accessibility, should be in proportion to the mathematical probability of the profitable use of each item. The word 'profitable' in this context means that the value (not necessarily in monetary terms), derived from the application of the information, must be greater than the cost of acquisition, storage and retrieval. Any other criterion would imply wastage of limited resources which could otherwise have been diverted to more potentially valuable information.

I am sure that many members of this audience will immediately recognize in this criterion a basic principle of the operation of special libraries. Special librarians have always had to be cost-conscious and to spend their resources and effort with profit in mind—the very conditions we now face, globally, through logistic saturation. This is why, when considering what the future perfect library should be I have found myself thinking more and more of my experience in special librarianship.

By implementing their 'life and death' decisions on library stock, and by the way in which they exploit this stock, librarians are collectively able to exert a significant influence on the choice of the content of the active band. But because they have been so reluctant to discard their belief in the fundamental right to all knowledge many librarians, those in the academic field especially, have shied away from exerting this power because they have thought it unethical to do so. Special librarians, on the other hand, have learnt that maximum good for their organization can only be achieved by some measure of control of library usage. It is not assumed that the special library customer is always right, nor that he must always have what he *thinks* he needs. It is the duty of the librarian to select and pass on only the most potentially useful material. Ranganathan's famous canon 'Save the time of the user' has in such libraries been extended to 'stop the user *wasting* his time'—a much more constructive approach.

I see this increased influence of the librarian as an indispensible feature of the future perfect library system. I am tired of watching television programmes in which teachers, doctors, engineers, chemists, social scientists and psychiatrists occupy the screen to claim that they must be allowed to take control of various situations because, from their professional experience, they know best! Why then, are librarians so willing to abrogate a responsibility which they could clearly, exert? I can see no reason why librarians, trained and experienced in the selection and evaluation of the information on which judgments are made by planners and innovators, need to be regarded as any less competent and socially responsible than any other professionals who exert an influence on the progress of events. If they do not exert this influence then they fail in their professional duty. And failure to assume control is not the same as doing nothing. Not to be selective invokes unfavourable logistic reactions.

Let us, for example, be bold enough to examine the situation in the humanities. Here the strongest feelings are expressed against discarding material or restricting the size of libraries; scientists are more ready to accept that concepts are subject to correction. For workers in the humanities, the basic raw material is often the written word and frequently libraries are the only means of access to it. 'Libraries are our laboratories' is a phrase often used. If this phrase represents a true state of affairs, rather than an underlying jealousy of scientists' supposed advantage in having an extra resource, then it must be taken seriously. It would be easier to accept the position if some of the research in this area did not raise doubts. Some doubts may arise, for example, when exaggerated attention is focused on first thoughts and the development of ideas to the detriment of concentration on the finished work of artists, authors or composers. Hence the expensive scramble for first editions, discarded and corrected manuscripts, the insistence on X-ray examination of initial and later-improved brush strokes, and the whole range of similar research. My little grand-daughter would term the whole exercise 'reediclious' because it is aimed, not at study of what a person has achieved by genius but at an attempt to discover the origin of the ideas. As if that mattered at all in relation to the fine new achievement. There is even, in research in the humanities, a form of academic pseudo-kudos attached to inaccessibility whereby it is judged that the more obscure a source is, the more erudite the work on it must be. It reminds me of Pomfret Tudor in Dornford Yates' *Stolen March* who, describing his research project, said: 'I am engaged, sworn to light such a candle of utter futility as no fool will ever take the trouble to put out.'

If these things are what the world really needs, and are an essential part of research, then one need say no more, except to underline that they are inordinately costly and can only be obtained at the expense of losses in other directions. I see no reason why librarians should not put up some resistance to being compelled to bid in scarcity markets while current acquisitions suffer. It is all a question of value for money and professional decisions should be weighed along with others when determining what is best for the progress of society. The librarian of the perfect library must be willing to take such decisions even where they might be thought to border on censorship. We have at the moment, for example, a situation where one section of our national library is having to put up its loan charges substantially in an effort to recover costs, while another section assiduously collects and expensively stores all the 'alternative press' publications it can lay hands on. It is thought these might mirror our times and so be desirable subjects for a future generation of sociologists to study. If rejection of this class of material would be censorship then it would be logistically wise rather than ethical censorship, and therefore it would be made in the interest of conservation of resources.

One interesting feature of logistic decline should be stressed because it is important for the future perfection of the world's library services. Under the conditions it creates, the law of diminishing returns is no longer a barrier to the attainment of perfection but a powerful ally of the librarian seeking it. But it is a different kind of perfection. The gross imbalance in the return for given effort shown between the lower and higher reaches of the diminishing-returns curve can be put to practical use to save money if acquisitions are concentrated on high-return publications. There is a great deal of evidence to show that this can be done without significant loss. Bradford's well-known investigations into scatter, which demonstrated a square-law increase in the number of periodicals which have to be scanned to reveal a given number of articles of relevance to a particular subject, is also a clear statement of the fact that a large proportion of available relevant articles are to be found easily and cheaply, where expected, in a small number of core journals. The Pareto Law for distribution of incomes, which has also been found to apply to usage of periodicals, shows that half the total demand for the 49,300 titles held by the NLL at Boston Spa would be expected to fall on the square root of this number, a mere 222 journals. Figures published recently confirm the finding. Davinson points out that however many periodicals there are it is inescapable that very few are of first-line significance in the transmission of newly-generated knowledge carefully evaluated and thoroughly checked. Even more staggering, in assessing a journal collection at the University of Rhode Island, USA, Chambers and Healey found that only a tiny proportion of the periodicals supplied in the library were cited in masters' theses—55 per cent of all citations coming from ½ per cent of the holdings, and more than 75 per cent from 1½ per cent of the holdings. Two-thirds of the periodicals collection was cited less than once in ten years. Again Martyn and Gilchrist, in an Aslib study, found that each 5 per cent step above 80 per cent satisfaction would require a doubling of the supply of journals.

These old and new figures of imbalance show the force of the diminishing-returns situation which, applying to any form of library usage, offers a possibility of enormously increasing the cost-effectiveness of acquisitions provided it is decided what success rate in finding information users are entitled to expect.

Experience in special libraries shows that a 75 or 80 per cent success rate in satisfying users can be reached at moderate cost and this figure can be raised by 5 per cent without the doubling of the supply that Martyn and Gilchrist found necessary. It can be done by refining acquisitions policies by careful study of use over a period, by application of known obsolescence data, and by co-operation with other libraries in areas of marginal importance. The greater effectiveness of special libraries in the United Kingdom compared with their much-better-endowed American counterparts results from the voluntary but efficient network of co-operation between them—a network which covers exchange of information as well as interloan of documents.

But unless the library is to stray into the area of diminishing returns, where maximum resources have to be used for minimum gains, further improvements must be made in other ways. The best and cheapest way is to increase the exploitation of the material actually in the library. There are two facets of this. First, users learn the potential value of the stock and thereafter align their demands more closely with the library's holdings. Secondly they learn not to request particular documents, but rather, with an open mind, to seek answers to problems. Users who have a preconceived idea of the sort of answer they expect find fault with the library that does not give it. Users with a mind open to new ideas praise the library that puts those forward. Thus a library attains perfection from the skill with which its librarian finds a threefold match between the problem, the context in which it arose, and the information available to solve it. Given a well-selected stock an experienced librarian can supply from it as much information as most of his users have time, money and mental resources to exploit.

Now there is one subject that I must introduce here and I am sure you have been wondering when it is coming. I refer, of course, to computerization. Both users and librarians pin their faith on computers to bring in the golden age of librarianship. Yet everyone has his own personal experience of the frustrations of dealing with them, and their logical illogicality. My own favourite story is of the tycoon who was scared that he might travel on a plane in which a hijacker had planted a bomb. He called for a computer study of statistics and was horrified to find that the chances of a bomb on board were as high as one in fifty thousand. He asked if there was any possible way to reduce such a risk. And the computer told him that there certainly was. It suggested he should travel with his *own* bomb as the odds against two bombs on an aircraft were ten million to one! Unquestionably computers have great potential for library housekeeping—things like acquisition and loan records, and cataloguing—and for storage and retrieval of information. But there are snags. A serious one is that most computer systems currently available have been designed on the assumption that their data bank will be allowed to grow indefinitely. As we have seen this type of growth is self-defeating. No matter how fast computers can be made to operate they will inevitably suffer from increased access-time as the system grows. Nor is it easy to curb this growth because computers are inherently unfitted to weeding processes. Another considerable disadvantage is that post-coordinate selection, the method employed in most computer retrieval systems, shows over-rapid cut-off of data. For example, four features used in a search may leave far too many hits while five features leave none at all.

Yet one more snag is that it is difficult to design machines which can handle simple enquiries without involving the whole complexity the system must have to deal with those which are difficult. Reluctantly one has to say that, compared with manual methods, the cost-effectiveness of computer retrieval systems has not yet been impressive.

I know that Kent was being deliberately provocative when he wrote his 'Dial up and die' article in the March 1978 *Information Scientist* but it is hard to gainsay the validity of much of what he said. He sees current on-line search systems, both in absolute and in cost terms, as less effective than any other retrieval methods. He contends that most users of such systems are unaware of their inefficiency and high cost; indeed, to use his words, 'the very naivety of the systems so exactly coincides with that of the users as to reinforce the belief that they are both effective and cheap'. By contrast other systems are thought to be ineffective and costly, which they are not. This simple-minded approach of users encourages suppliers to reduce the expensive intellectual input to match the simplicity of the systems. In all this Kent sees a risk of permanent damage to conventional systems now starved of support, and later, to the on-line systems themselves as disillusionment spreads.

Backing for this view has quickly followed. At a meeting of Blaise, held only last month, notice was given of 25 per cent higher royalty charges. The reason is that those organizations which own data-bases as a result of computer-assisted publishing of abstracts, have lost hard copy sales due to transfer of interest to on-line searching. So they claw back more money to maintain their income and repay development costs. Initial on-line costs were set low to encourage use and because the data base was there as a byproduct. What now, when the byproduct has to support the main product it is strangling?

Prestel, the Post Office's wonder teletext system, has been long awaited by public librarians as *their* way into the glamour of computer information. Even before becoming available to the public, however, its charges have been raised fourfold so that to join the club costs fourteen hundred pounds a year. At the same time the number of saleable frames has, without explanation, been dropped from a quarter of a million to 63,000 and access is to be limited to a few so-called 'information brokers'. What has gone wrong? I will tell you. With all of these systems there has been lack of proper collaboration between librarians, equipment manufacturers, programmers and users. Software and hardware skills must go hand in hand to create an effective system. So far, index design and specification of desirable search strategy have fallen far behind the mechanics of the system.

The poor relevance and pertinence of the output from some systems has led to an interesting proposal—that a new kind of liaison person should act as a trained and experienced system operator to design searches and to sift results before passing them on to the user. The information officer has been re-invented!

In the rush to cash in while the wave of euphoria lasts inadequate intelligence has been brought to bear on system design. Like the heraldic serpent which swallows its own tail my argument has come full circle. I define *my* perfect library in terms which make it attainable; and because it is attainable I say it is *the* perfect library. And if you think that is a silly argument I am telling you that it is not, it is eminently sensible because it is set in the context of saturation logistics. And as we have seen saturation logistics calls for decisions from librarians.

Let us think first of public librarians. Their libraries have taken on board so many activities that the mind boggles. Advice on interest and hobbies; services to commerce, industry and education; archives and local history; recreational reading; background reading for personal studies; non-book media; on-line retrieval services; teletext; illustrations and picture loan; gramophone records; lectures and cultural services; services to house-bound readers, hospitals and immigrant communities. The list is long, the resources are limited.

It is impossible to travel on every band waggon so the public librarian must decide which of these services gives the best value to the community and concentrate on those. This is *his* way to the future perfect library.

Academic librarians are next: They must decide what, and how much of the world's knowledge they will collect. They must accept that their collection will be limited and choose it in the realization that it influences the direction of research. And, most important of all, they will have to accept the inevitable advent of the self-renewing library.

Finally we come to special librarians, and how fortunate I am that this is an Aslib lecture, because special librarians alone have come near to making their libraries perfect, through having had to live so long with cost control.

But for total perfection these three groups of librarians must become one group. There is an encouraging move in this direction in the recent call for a national co-ordinating body for all library services. The body that I believe is needed must be independent of government, the national library, and all other agencies. Like the United States National Commission on Libraries and Information Science its remit must be to study and appraise the role of libraries as resources for scholarship, as centres for the dissemination of knowledge, and as linked components of a national information system. It must have the power to command, but also the will to conserve, resources. Above all its members must fix their sights on the *attainable* goal of the future perfect for librarianship.

Using APPARAT: Cataloguing film and sound recordings at the Imperial War Museum

Roger Smither

Keeper of the Department of Information Retrieval,
Imperial War Museum

The article provides a progress report on APPARAT, *the Imperial War Museum's off-line computer system used in the documentation of its archival collections of film and sound recordings. After opening with a reminder of* APPARAT*'s vital role in the Museum's film preservation programme, the report concentrates on the system as a device for cataloguing the holdings. The catalogues and indexes generated by the system are illustrated and explained and the facilities for* ad hoc *enquiries outlined. Consideration is also given to areas in the system where room for improvement remains, including the resolution of a debate on subject indexing, and the provision of computer typesetting. The latter part of the article considers the system from the cataloguer's, rather than user's, viewpoint, in particular with reference to the conventional assumption that working on a computer cataloguing system is more demanding than operating a conventional system.*

IT IS NOW three years since the Imperial War Museum announced the introduction of its computer system APPARAT, and, with the novelty worn off and the shortcomings revealed and—in most cases—removed, the time is ripe for a progress report. This survey will concentrate on APPARAT as a system for cataloguing film and sound recordings; to retain a correct perspective, however, readers must bear with a short reminder that there is another side to APPARAT.

As the acronym implies once decoded (APPARAT stands for Archive Preservation Programme And Retrieval by Automated Techniques), the leading considerations in the original specification for what became APPARAT were all to do with the conservation of material in the Museum's archival collection of films. In the archival context, an interest in what a film is about must logically be regarded as of secondary importance to a concern that the film should survive to be 'about' anything at all: anyone acquainted with the problems of looking after a large collection of nitrate film will appreciate that an apocalyptic turn of phrase is not much exaggerated. APPARAT, then, actually comprises two subsystems, and one of them is entirely concerned with describing the physical condition of the film in the Museum's care. The data stored include the results of the tests carried out on film to monitor its deterioration, and the system interprets those results to generate schedules indicating each month which films should be re-tested. Only a careful programme of this sort can ensure that limited conservation resources are applied where they are most needed. Cataloguing has never been regarded as more important than this function.

APPARAT is an off-line system. Visitors coming to look at APPARAT sometimes express surprise or disappointment that they cannot sit down at a terminal and put questions 'on line' to a computer. The prosaic truth is, however, that the

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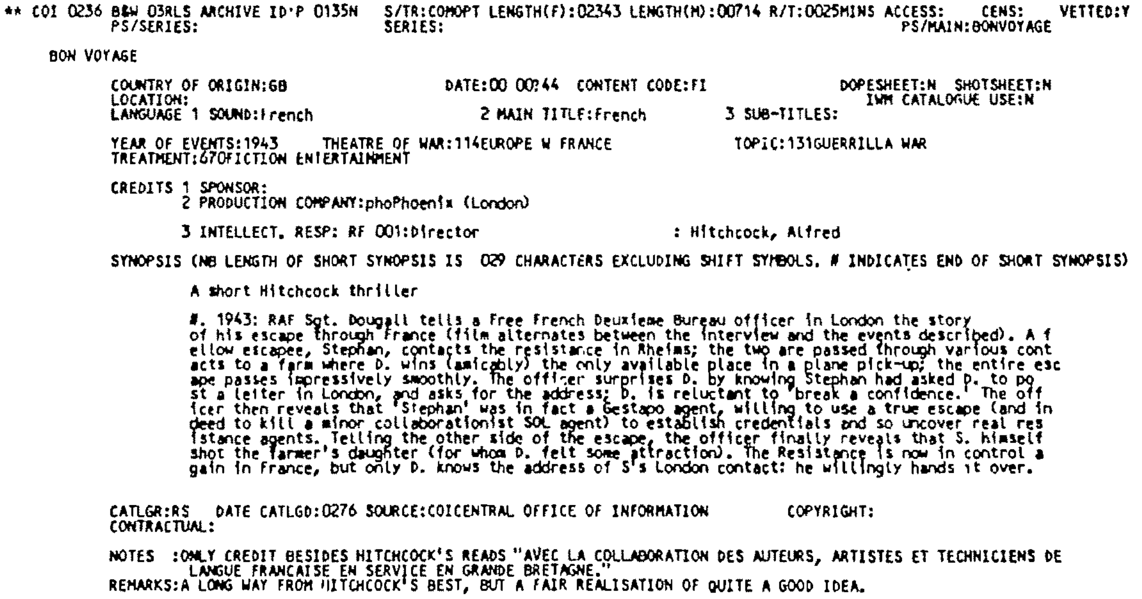
nature of the vast majority of the requests for film or sound material which the Museum receives and the way in which it prefers to handle them can be so comfortably accommodated within an off-line system that equipment and programs for on-line access would be mere luxuries. The geography and economics of the Museum's link to the computer where APPARAT runs (the ADP Unit of the Department of Education and Science at Darlington) reinforce the argument. The basic picture of research at the Museum remains one of people reading paper—but now, instead of typed or handwritten library cards, the 'paper' for film or sound research will be computer printout or computer generated microfiches. The advantages the APPARAT catalogue and indexes have over the manual documentation that they are replacing are that the information itself (safely held on tape at Darlington) is secure against loss, damage or misfiling; that the reference listings it produces are uniformly up to date and available in several different locations in the Museum; and that new indexes or selective listings can be produced with practically no effort where before extensive human effort—sorting, copying and filing—would have been required.

APPARAT—the user's view

The day-to-day working materials for APPARAT users, Museum staff or outside researchers, comprise a catalogue and indexes whose function is to facilitate access to the catalogue. The 'catalogue' is a complete printout, sorted by Museum reference-number, of all the information about films and/or sound recordings so far entered into the system. A catalogue record is created as soon as the computer is informed of the existence of an item by the insertion of its Museum number: as much or as little information as is available may then be added—a title only, a full catalogue description, or any level in between. Information on file can be added to, corrected or amended, or deleted, at any subsequent stage. This facility enables the Museum to create skeleton records—for example, on acquisition of material—prior to complete cataloguing, to incorporate retrospectively the fruits of later research, and so on.

A specimen entry from the film catalogue is reproduced as Figure 1. It is largely self-explanatory. The top line carries minimal *technical* information on the print viewed by the cataloguer, including soundtrack type, length (feet and metres), running time, etc. More complete information is, of course, available in the technical file. The next area covers *titles*—a film may be recorded with several alternative titles and a series title in addition to its main title. Pseudo-titles ('PS/MAIN', etc.) facilitate alphabetical ordering of film titles where filing conventions diverge from computer logic. The area *Year of Events*, etc., carries approximate classifications of film content and style which may be used to generate selective listings—for example, all films made concerning the First World War, whether they are contemporary newsreels or retrospective television programmes. *Credits* (in the example shown, only credits 2 and 3 are used) may consist of five areas. Credits 4 holds Production Team credits below the 'intellectual' (Director/Producer, etc.) level of credits 3; credits 5 holds a cast list for acted films. *Synopses* are so written that the first few words contain the briefest possible summary of the nature of the film—the remainder provides a more complete *resumé* of the plot, argument or action. Following the synopsis



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** COI 0236 B&W 03RLS ARCHIVE ID'P 0135N   S/TR:COMOPT LENGTH(F):02343 LENGTH(M):00714 R/T:0025MINS ACCESS:    CENS:    VETTED:Y
            PS/SERIES:                     SERIES:                                                     PS/MAIN:BONVOYAGE

     BON VOYAGE

            COUNTRY OF ORIGIN:GB                DATE:00 00?44  CONTENT CODE:FI                DOPESHEET:N  SHOTSHEET:N
            LOCATION:                                                                            IWM CATALOGUE USE:N
            LANGUAGE 1 SOUND:French                 2 MAIN TITLE:French         3 SUB-TITLES:

            YEAR OF EVENTS:1943     THEATRE OF WAR:114EUROPE W FRANCE              TOPIC:131GUERRILLA WAR
            TREATMENT:670FICTION ENTERTAINMENT

            CREDITS 1 SPONSOR:
                    2 PRODUCTION COMPANY:phoPhoenix (London)

                    3 INTELLECT. RESP: RF 001:Director                    : Hitchcock, Alfred

            SYNOPSIS (NB LENGTH OF SHORT SYNOPSIS IS  029 CHARACTERS EXCLUDING SHIFT SYMBOLS. # INDICATES END OF SHORT SYNOPSIS)

                    A short Hitchcock thriller

                    #. 1943: RAF Sgt. Dougall tells a Free French Deuxieme Bureau officer in London the story
                    of his escape through France (film alternates between the interview and the events described). A f
                    ellow escapee, Stephan, contacts the resistance in Rheims; the two are passed through various cont
                    acts to a farm where D. wins (amicably) the only available place in a plane pick-up; the entire esc
                    ape passes impressively smoothly. The officer surprises D. by knowing Stephan had asked D. to po
                    st a letter in London, and asks for the address; D. is reluctant to 'break a confidence.' The off
                    icer then reveals that 'Stephan' was in fact a Gestapo agent, willing to use a true escape (and in
                    deed to kill a minor collaborationist SOL agent) to establish credentials and so uncover real res
                    istance agents. Telling the other side of the escape, the officer finally reveals that S. himself
                    shot the farmer's daughter (for whom D. felt some attraction). The Resistance is now in control a
                    gain in France, but only D. knows the address of S's London contact: he willingly hands it over.

            CATLGR:RS   DATE CATLGD:0276 SOURCE:COICENTRAL OFFICE OF INFORMATION        COPYRIGHT:
            CONTRACTUAL:

            NOTES  :ONLY CREDIT BESIDES HITCHCOCK'S READS "AVEC LA COLLABORATION DES AUTEURS, ARTISTES ET TECHNICIENS DE
                    LANGUE FRANCAISE EN SERVICE EN GRANDE BRETAGNE."
            REMARKS:A LONG WAY FROM HITCHCOCK'S BEST, BUT A FAIR REALISATION OF QUITE A GOOD IDEA.
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FIG 1

APPARAT FILM catalogue entry

comes a 'housekeeping' area for recording details of provenance and restriction, and three general areas (two only used in the example)—'Notes', 'Remarks' (which permit the cataloguer space for a subjective reaction to the film, to offset the rigid objectivity demanded in the rest of the catalogue description), and 'Documentation/Associated Material'.

a

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JEFFRYES, JOAN                    STILL PHOTOGRAPHS
                   F  MGH 0718  T E LAWRENCE
JEFIMOW, EUGENIUSZ                PHOTOGRAPHY
                   F  MGH 0737  ZAGLADA BERLINA
JENKINS, PATPIC M. CLT.     ASSISTANT DIRECTOR
                   F  COI 0486  DESERT VICTORY
JENNINGS, AL                      MUSIC
                   F  CCE 0211  WEST INDIES CALLING
JENNINGS, HUMPHREY                DIRECTED
                   F  UKY 0730  A DIAR" FOR TIMOTHY
                                  DIRECTOR
                   F  COI 0432  [FIRES WERE STARTED
                   F  UKY 0221  SPRING OFFENSIVE
                   F  UKY 0269  THE HEART OF BRITAIN
                   F  UKY 0283  WORDS FOR BATTLE
                                  PRODUCER
                   F  COI 0433  THE EIGHTY DAYS
                                  SCRIPT
                   F  COI 0432  [FIRES WERE STARTED
```

b

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UKY 0522 LPU YNN    M CAMERAMEN AT WAR

                    A CAMERA BEPORT ON ATROCITIES FOUND IN GERMAN CAMPS
                       M   ATRCCITIES FOUND IN GERMAN CAMPS

COI 0036      YN    M IL CAMMINO DEGLI EROI
                       A      2 LE CHEMIN DES HEROS
                       A      1 DER MARSCH DER HELDEN
                       A      3 [O THE WAY OF THE HEROES]

WOY 0057      N     M CAMOUFLAGE (ALL ARMS)

WOY 0266      N     M CAMOUFLAGE AND FIELDCRAFT : PREPARE FOR BATTLE
                       S   BATTLE DRILL

COI 0160      YNN   M CAMPO 63

CCN 0201 LPU YNN    M CANADA AT WAR  (YEAR 5 NO. 12)
                       S   MARCH OF TIME

                    S CANADA CARRIES ON
                       M   ATLANTIC PATROL
                       M   FIGHTING SEA FLEAS
                       M   GUARDS OF THE NORTH
                       M   HEROES OF THE ATLANTIC
                       M   MOSQUITO SQUADRON
                       M   PROUDLY SHE MARCHES
                       M   THE STRATEGY OF METALS
                       M   UNIVERSITIES AT WAR
                       M   WINGS OF YOUTH

IWM 0237      N     M CANADIAN TRAMWAYS  (CARD TITLE)
                       A      1 A TRIP THROUGH BATTLE AREA OF LIGHT RAILWAY  (LEDGER TITLE)

IWM 0466      N     M THE CANADIAN VICTORY AT COURCELETTE

AMY 0247      N     M CANBERRA

AMY 0617      N     M CANBERRA

UKY 0278 LPU YNN    M CANTEEN ON WHEELS
                       A      1 MOBILE CANTEEN
```
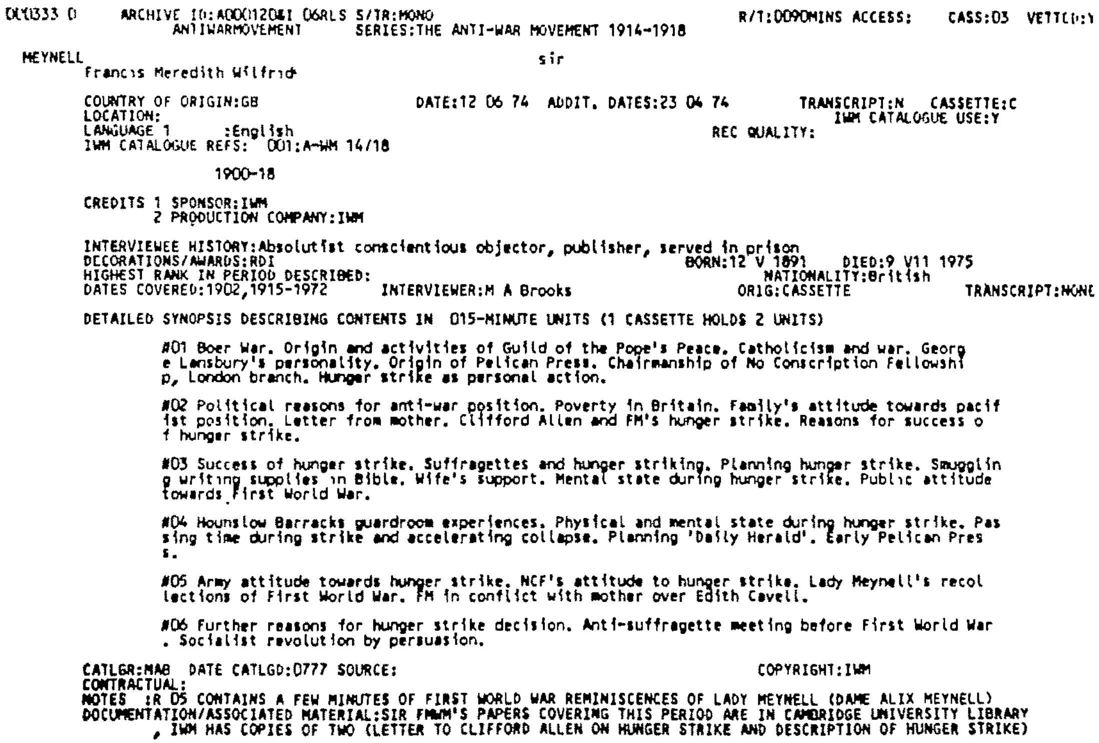

FIG 2

APPARAT indexes

c



```
000333 0     ARCHIVE ID:A0001204I 06RLS S/TR:MONO                        R/T:0090MINS ACCESS:    CASS:03  VETTED:Y
                     ANTIWARMOVEMENT     SERIES:THE ANTI-WAR MOVEMENT 1914-1918

 MEYNELL                                                  sir
        Francis Meredith Wilfrid

        COUNTRY OF ORIGIN:GB              DATE:12 06 74  AUDIT. DATES:23 04 74        TRANSCRIPT:N   CASSETTE:C
        LOCATION:                                                                        IWM CATALOGUE USE:Y
        LANGUAGE 1      :English                                            REC QUALITY:
        IWM CATALOGUE REFS:  001:A-WM 14/18

                       1900-18

        CREDITS 1 SPONSOR:IWM
                2 PRODUCTION COMPANY:IWM

        INTERVIEWEE HISTORY:Absolutist conscientious objector, publisher, served in prison
        DECORATIONS/AWARDS:RDI                                                 BORN:12 V 1891    DIED:9 V11 1975
        HIGHEST RANK IN PERIOD DESCRIBED:                                             NATIONALITY:British
        DATES COVERED:1902,1915-1972      INTERVIEWER:M A Brooks               ORIG:CASSETTE            TRANSCRIPT:NONE

        DETAILED SYNOPSIS DESCRIBING CONTENTS IN  015-MINUTE UNITS (1 CASSETTE HOLDS 2 UNITS)

                 #01 Boer War. Origin and activities of Guild of the Pope's Peace. Catholicism and war. Georg
                 e Lansbury's personality. Origin of Pelican Press. Chairmanship of No Conscription Fellowshi
                 p, London branch. Hunger strike as personal action.

                 #02 Political reasons for anti-war position. Poverty in Britain. Family's attitude towards pacif
                 ist position. Letter from mother. Clifford Allen and FM's hunger strike. Reasons for success o
                 f hunger strike.

                 #03 Success of hunger strike. Suffragettes and hunger striking. Planning hunger strike. Smugglin
                 g writing supplies in Bible. Wife's support. Mental state during hunger strike. Public attitude
                 towards First World War.

                 #04 Hounslow Barracks guardroom experiences. Physical and mental state during hunger strike. Pas
                 sing time during strike and accelerating collapse. Planning 'Daily Herald'. Early Pelican Pres
                 s.

                 #05 Army attitude towards hunger strike. NCF's attitude to hunger strike. Lady Meynell's recol
                 lections of First World War. FM in conflict with mother over Edith Cavell.

                 #06 Further reasons for hunger strike decision. Anti-suffragette meeting before First World War
                 . Socialist revolution by persuasion.

        CATLGR:MAB  DATE CATLGD:0777 SOURCE:                                COPYRIGHT:IWM
        CONTRACTUAL:
        NOTES  :R 05 CONTAINS A FEW MINUTES OF FIRST WORLD WAR REMINISCENCES OF LADY MEYNELL (DAME ALIX MEYNELL)
        DOCUMENTATION/ASSOCIATED MATERIAL:SIR FMWM'S PAPERS COVERING THIS PERIOD ARE IN CAMBRIDGE UNIVERSITY LIBRARY
                , IWM HAS COPIES OF TWO (LETTER TO CLIFFORD ALLEN ON HUNGER STRIKE AND DESCRIPTION OF HUNGER STRIKE)
```

FIG 3

APPARAT SOUND catalogue entry

Figure 2 reproduces sections of the two indexes most obviously required in a film archive—a credits index (2a) and an alphabetical titles index (2b). The credits index needs no explanation. The section of the titles list reproduced demonstrates the method used to cross-refer between main titles (M) and series and alternative titles (S and A). Full information is given at the main title location—users looking up a series (*e.g. Canada Carries On*) or an alternative (*e.g. Camera Report* . . .) are referred to the main title. Information provided at the main title includes, besides the number which enables the film to be looked up in the catalogue, a full list of other titles, an indication of the copyright status of the film where known (LPU, etc.) and an indication (in the three Y/N codes) of the documentation available on a film: the first Y or N (for Yes or No) indicates whether or not the film is fully APPARAT catalogued, the second and third indicate the availability of dopesheets or shotsheets. The section reproduced also shows the effects of the use of 'pseudo-titling'—to ignore the opening article in *Il Cammino degli Eroi* or *The Canadian Victory at Courcelette* for example.

Subject indexing has presented APPARAT's longest-running dilemma. The software has been written into the system to permit the entry for each catalogued item of a list of index keywords (the facility could equally well be used for UDC codes): they would appear on the catalogue printout between the broad classifications (Year of Events, etc.) and the credits, and would make possible the generation of an index comparable in appearance to the credits list. This facility has not, however, been much used because its use represents (unlike any of the other changes involved in conversion to APPARAT) a somewhat lower standard of service than was available with the manual system. The APPARAT index would offer, effectively, a book-type index: a keyword, followed by a list of numbers (and titles), leaving the user to pursue the list in the catalogue to find out more details. Under the manual system, each note of the appearance of a reference was accompanied by a brief explanatory statement which generally obviated the need to pursue a reference to a catalogue card before finding out whether or not it was suitable. While the Museum debates whether to accept a lowering of standards or to undertake the financial expenditure or human effort needed to duplicate the old standards in the new system, subject indexing remains a largely manual operation.

Sound records documentation is managed in similar fashion to film, except that in handling the Museum's collection of oral history interviews, the system adapts its expectations to suit the different needs of the material. In place of titles and credits, the system accommodates the name and an outline biography of the subject of the interview; other changes are made to reflect the different data-needs of magnetic tape compared to film—to allow notes of full, half- or quarter-track recording, etc. Figure 3 illustrates the changes. The options for index generation remain the same as those available in the film documentation.

Over and above the catalogue and indexes regularly generated, APPARAT offers the possibility of obtaining special-purpose lists through the sophisticated '*ad hoc* enquiry' routines. These permit system users to specify what they want the computer to look for, the order in which they want the found items to be listed, and the quantity of information on each item to appear in the final list. The computer may be asked to look for targets either positively ('Language must be

English') or negatively ('Country of origin must not be Britain'). In certain areas, additional types of search are permitted—for example, lengths and dates may be searched for minimum or maximum values ('Total running time must be thirty minutes or less' or 'Date of production must be 1944 or later'), and credits may be looked for in open-ended form (for example 'Bland, W-' to find all references to a man who, in different items, may be named as Bland, W.; Bland, William; Bland, W. S.; Bland, William S., etc.). Up to five targets may be listed in a single search, and may be given as cumulative stipulations ('Interviews must have accessible copyright status *and* English language *and* must cover the First World War period'), or as acceptable alternatives ('Country of origin may be Australia *or* Canada *or* Britain *or* India *or* New Zealand'), or as a combination ('Film must be produced after 1939 *and* before 1946 *and* must have either English sound *or* English subtitles'). The items found in a search may be sorted to the user's specification, and the 'sort' criteria need not have anything to do with the 'search' requirements—material selected by length and language might be sorted chronologically within county-of-origin groups. Similar freedom extends to the amount of information printed in the resulting list—the user may see as few or as many data fields as he requires. He may, finally, specify paper or microfiche output. The routines are, it will be readily seen, almost alarmingly versatile.

At the time of the original specification of APPARAT, use of computer typesetting to generate printed catalogues from the computer files was also intended. This goal fell foul of the long-running dispute within the printing industry over computer typesetting, and is still unrealized. Catching up on this problem, and resolving the subject-indexing debate, are the two remaining areas requiring attention before the Museum considers itself totally happy with the service that APPARAT enables it to offer its users; it is hoped, however, that this article demonstrates that the facilities already available are far from negligible.

APPARAT—the cataloguer's view

We have so far been looking at APARAT's output, the face of the system seen by the user, the researcher. It is, of course, a rather different aspect that is seen by the cataloguers, those responsible for input. Since it is generally assumed that working on a computerized system is more demanding than working on a conventional one, it may be instructive to see how far the experiences of Museum staff corroborate or contradict this impression.

The basic operation of the system is illustrated by the flow-chart reproduced as Figure 4. As the chart indicates, there are three sources of information for the system: cards from the old manual cataloguing system, input forms, and correction (or amendment) forms, used for making small-scale changes to the records created by the first two sources. It will also be seen that the work of processing the information into machine-readable form is in all cases delegated to outside agencies—either a bureau using optical character recognition typing and scanning to generate tape, or to an agency punching 80-column cards. The cataloguer, in other words, does not need to do anything to his work—does not, indeed, see his work—between completing his input media (these days, with

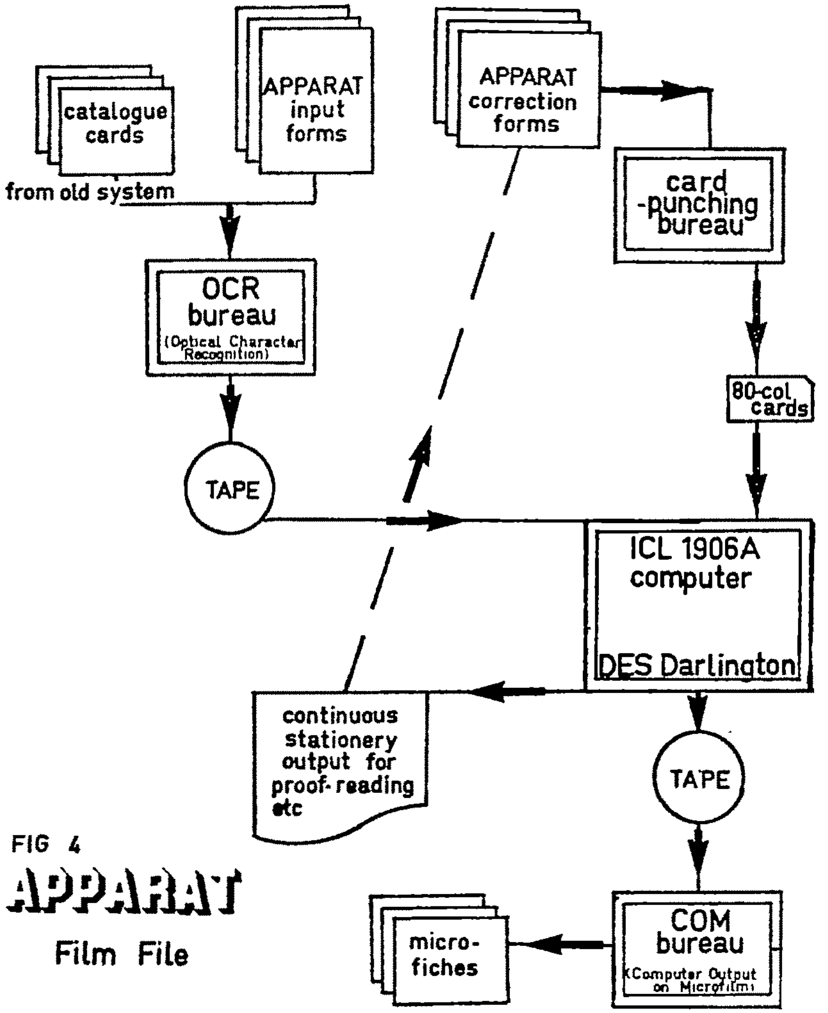


FIG 4
APPARAT
Film File

most of the old catalogue cards already converted, these are almost invariably manuscript forms) and receiving from the computer printouts to proofread.

This is not quite to say that nothing has changed from the days when handwritten forms were sent to a typing pool and returned as typed catalogue cards for checking. Use of the system has imposed some additional constraints on cataloguers—formats must be carefully watched, and there is a maximum length for each field which may not be exceeded. Mention has already been made of the need at times to create 'pseudo-titles' to ensure the production of correctly-sorted alphabetical titles lists; the Museum has also gone over to listing individuals named in credits with surname first, to facilitate the production of the credits index. It could, however, be argued that none of these changes represents a major departure from established practice, and that equivalent changes might have been called for in a revision of a conventional cataloguing system. (It is sometimes forgotten that resistance to 'a computerized system' is largely made up, where it exists, of resistance to a new system of any kind.) The Museum's film cataloguing rules[1] remain recognizably one of a kind with established film cataloguing codes, although produced to cater for APPARAT input. The only other constraint that APPARAT imposes on cataloguers at the input stage is indirect: the taking of extra care dictated by the desire to anticipate the problems of proofreading.

It is undoubtedly in proofreading, in the task nowadays of checking the printouts returned from the computer, that the cataloguer's work has changed most with the advent of APPARAT. However desirable consistency may be in a conventional cataloguing system, the cataloguer checking the typing of a catalogue card knows that no one will really mind, if indeed they notice, an occasional trivial lapse. If there is a painfully literal-minded computer interpreting the data, on the other hand, a trivial lapse may have all the effect of a major one. If a typist has accidentally omitted the comma that conventionally separates surname and forename in a credit citation, for example, so that 'Jennings, Humphrey' appears once as 'Jennings Humphrey' the credits index will dutifully set up a new heading for the variant form. Some error-spotting is done automatically by the system itself at the 'validation' stage of input. APPARAT has set expectations for many data fields and will reject entries that do not match those expectations—for example a 'running time' entry that is not a number greater than zero, or a 'soundtrack' entry that is not one of six permitted codes (such as a misspelling of 'silent' as 'slient') will not be accepted. There is, however, an obvious limit, in as fluid an area as film cataloguing, on the number of cases where system validation can be much help. In all other cases the proofreader's eye for a mistake *must* remain as keen as, in a conventional system, it is merely desirable that it should.

The actual work of making a correction is also more involved. Again, it may not be the way a cataloguer should behave, but an institution will often connive at manuscript corrections to typed catalogue cards—to supply, perhaps, the missing comma in the previous paragraph's example. Quite obviously, this does not suffice for a computer system; the computer must be instructed to amend the data base. APPARAT permits changes at the level of a single letter or symbol in a 25,000-character synopsis—but the cataloguer must tell the computer which character needs changing. For some of the shorter data fields, the only way in which a correction may be made is by rewriting the entire entry—in fact, 'credit' names are just short enough to qualify for this requirement, so to deal finally with that missing comma would require writing over the comma-less entry with a correct one. The nature of the specific computer installation on which APPARAT runs (as distinct from anything necessarily inherent in computerization generally) imposes one additional proofreading irritant: the ICL 1906A is not a lower-case machine, so shifts out of and into capital letters must be indicated by shift characters. At the stage of first input, this is part of the service provided by the OCR bureau, but at the correction stage it becomes an additional part of the cataloguer's responsibility. In the same way, therefore, as computerization enforces more careful proofreading than conventional cataloguing might tolerate, it also means that making the ensuing corrections is rather more troublesome. The trouble is, however, in the form of a need to take pains, not a need to master great technical complexities.

The last area of interest or apprehension among visitors concerns the actual running of the system, the business of telling the computer what to do. In this context, it must be said that the Museum owes a very great deal to the understanding and helpful attitude of the staff at the DES computer unit at Darlington, and scarcely less to the employees of the bureau (Computer Aid for Management Ltd) who wrote APPARAT. Thanks to their efforts, the task of listing requirements for each month's run is well within the capabilities of the untrained history graduates who have that responsibility. The work required of the Museum is confined to specifying which routines are needed, and to choosing between variable options—most obviously in requesting an *ad hoc* enquiry, but also in asking, for example, for a credits list where the Museum may choose between an index of 'intellectual' credits, general production credits, or cast credits, or any combination. As was observed of proofreading, the task requires great care, but it does not call for computer expertise. Its accessibility to the layman is one of APPARAT's most useful characteristics.

NOTE

Reproductions of APPARAT output derived from COM microfiches (Figures 1–3) are printed (to fit this journal's format) at only 24× magnification instead of the correct 42×. The loss of legibility resulting from this, and from the further processes involved in printing, is regretted.

REFERENCE

1 SMITHER, R. B. N. *with* PENN, D. J. *Film Cataloguing Handbook*. Imperial War Museum, London, 1976.

Developments in patent documentation

Vincent S. Dodd

Superintending Examiner, The Patent Office

Paper presented at an Aslib Evening Meeting, Aslib, 1st November 1978

TO BEGIN WITH I should explain my relatively short acquaintance with documentation matters. Until three and a half years ago my experience was entirely on the examining side of the Patent Office and my acquaintance with the documentation side (or classification section as it is more familiarly known in the Patent Office) was limited to reorganizing several of my search files. Due to a series of retirements at the office I suddenly found myself translated to the Classification Section with the need to catch up very rapidly on classification theory and practice as it applied to patent documents, and in particular to become acquainted with the international organizations operative in this field.

I should also explain that in the UK patent office many matters dealt with in other patent offices by the documentation section are here dealt with by the British Library—and dealt with very efficiently, if I may say so. However, this does have the effect of restricting the UK office documentation section to internal office matters (search files, classification key revision, liaison over printing of patent documents) and leaves the contact with users almost entirely in the hands of the SRL. As a result I have a certain feeling of 'teaching grandmother to suck eggs' in this talk so I offer my apologies in advance if a lot of what I say is very familiar to you.

You may wonder what precise need there is for international co-operation in classification and documentation. The reasons are basically two: First, there is the desire, common to most activities, to share experiences and with patent offices existing as national institutions this inevitably means international getting together. A second, more important reason, and one I am sure most of you are experiencing all the time, is the enormous increase in the outpouring of published documents of all types, and particularly the increase in the numbers of published patent documents. At a meeting about three years ago the US patent office presented figures and charts pointing out the nature of the problem facing offices which hoped to store world-wide collections of patent documents; with a total number of patent applications world-wide of about 850,000 per year, and with an office such as the US doing a world-wide search holding about 25 million patent documents, the problem of storing and searching these documents was increasing enormously. This provides a powerful incentive to international co-operation to cope with the problem.

Patents

The patent system is a bargain struck between an inventor and the state. A

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patent is a limited monopoly granted by the state to the owner of an invention to have the sole right to operate or work the invention for a certain number of years, formerly sixteen in the UK but now twenty. In return for this monopoly the inventor discloses in his patents specification how to carry out the invention. The theory is that the publication of the technical information about inventions in patent specifications stimulates further invention and thus benefits the state. It therefore follows that means have to be devised to enable inventors (in which I include research organizations, development departments, and anyone interested in developing something new or benefiting from the technology disclosed in patent documents) to gain ready access to the particular corner of technology in which they are interested. This is one of the main incentives to the development of complex and detailed classification systems for patent documents. A second is the device of most patent systems to grant patents which have a reasonable probability of validity and to do this it is necessary to make a search through the already published patent documents to make sure that the invention of every patent applied for is novel and not obvious *i.e.* no one else has previously been granted a patent for that invention or one so near to it that the difference is trivial and not inventive. To be able to make this search in a reasonable and economical time again calls for a very detailed classification system.

Such classification systems for patent documents were developed independently and on different principles in the various patent-granting countries. The UK system was one of the first and most elaborate but the US, German, Dutch, Russian and Japanese offices and many others all developed their own considerably differing systems. In time the situation developed that most patent offices were taking in one another's patent documents and having to classify them on to their own domestic classification, which is a very costly operation for the numbers of documents involved.

History of BIRPI

Here I should say a word about the development of international co-operation in the field of intellectual property *i.e.* patents copyright, trade marks, designs. This co-operation began in 1883 with the Industrial Property Union founded by the Paris Convention for the Protection of Industrial Property, known as the 'Paris Union'. Originally eleven member states, there are now about ninety. This was concerned with the rationalization of patent law in individual countries and was paralleled by a similar Union (Berne Union) in the Copyright field which now has about seventy contracting states. These Unions eventually co-ordinated their activities with a joint Bureau entitled 'United International Bureau for the Protection of Industrial Property' (BIRPI) with headquarters originally in Berne but from 1960 in Geneva. This Bureau was under the control and supervision of the Swiss government.

At quite an early stage, 1904, it was recognized that it would be advantageous to harmonize classification systems and to create an International Patent Classification. The *theory* was that with all patent documents classified on the same, international system and with the classification symbols printed thereon each office could file other countries' documents without having to reclassify them, relieving it of a considerable and costly burden.

Development of IPC

In 1904 BIRPI forwarded a draft proposal for an international classification. The comments were mainly unfavourable, the feeling being that due to the fast development of technology in different fields in the various countries a common system would not allow its optimum use. Later proposals also came to nothing until after the creation of the Council of Europe in 1949 a French senator, Longchambau, submitted a plan for establishing a European Patent Office. A Committee of Experts set up to examine the proposal felt a common classification system would be of use and set up a working group to elaborate such a system. After various false starts a first draft was produced in 1953 based on the existing German classification system since this was widely used in Europe. A basic layout of 8 sections, 103 classes and 594 sub-classes was agreed.

To be useful for search purpose this basic framework needed further subdivision and it was agreed that the system and its development would be based on a convention obliging the signatories to put classification symbols on their published documents. This Convention named 'European Convention on the International Classification of Patents for Invention' was signed in 1954 and came into operation in August 1955, the system so far agreed being an annex to the convention. Working Groups were formed to further elaborate the system, the aim being to devise a pigeon-hole classification system in which each pigeon-hole (group or sub-group) would contain between 100 and 200 documents. The whole elaboration was finished in 1966 and the first edition of the PIC entered into force on 1st September 1968 (8 sections, 115 classes, 607 sub-classes, 6,000 main groups and 40,000 sub-groups).

In the 1960s it was felt that member states needed to exert more influence than they could ever the Swiss government-controlled BIRPI and in 1967 the World Intellectual Property Organization was established by convention, taking over from BIRPI the administration of the Paris and Berne Unions in 1970 and becoming a specialized agency of the United Nations.

Parallel with this development, interest in the work of the Council of Europe in the patent field was spreading beyond the member states of the Council to the eastern bloc COMECON countries who began applying the IPC symbols to their documents but had no say in decisions relating thereto. An *ad hoc* Committee of the Council of Europe and BIRPI was convened in 1968, the outcome of which in 1971 was the so-called 'Strasbourg Agreement' which entered into force in October 1975 and replaced the Council of Europe Convention on the IPC. The countries party to the Agreement constitute a 'Special Union for the International Patent Classification' (IPC Union) which is on a level with the Paris and Berne Unions and is administered by WIPO. At present it has twenty-five members. The work of the IPC is organized by a 'Committee of Experts', the revision of the classification being undertaken by four Working Groups manned by classification experts from various offices. The revision is based on a five-year cycle, *i.e.* a new, revised edition is published every five years, although the first revision period was extended so that the second edition of the IPC became operative on 1st January 1975 and the third edition will be operative on 1st January 1980. Each edition is printed in English and French versions, and other versions in German, Spanish and Russian also exist.

The main purpose of the IPC is to form an effective search tool for retrieval of information from patent documents by patent offices and other users to establish novelty of an invention and evaluate its inventive step. It also has the aim of fulfilling subsidiary purposes such as enabling investigation of the state of the art in an area of subject matter but its search-tool aspect is its main purpose. How efficiently it fulfils this purpose is a matter of opinion; like the curate's egg it is good in parts. Nevertheless it is used as the main search tool by the German and EPO offices and I understand Japan is considering adopting it as its sole classification system and the Russian office is intending to use it at least for its PCT minimum documentation. Many other small offices, particularly non-searching offices, arrange their documents according to the IPC symbols printed thereon for easy access. The IPC thus has fairly wide use and is regarded as a very interesting example of international co-operation. Its main drawbacks at present are:

(a) the slow rate of revision, which results in parts of it becoming very out of date with changing technology; and
(b) inconsistency of application of the classification by different offices so that reliance cannot be placed upon another office's classification.

ICIREPAT

A second international organization dealing with information retrieval was also established in 1962 within the framework of the Paris Union. This was called the 'Committee for International Co-operation in Information Retrieval Among Patent Offices' (ICIREPAT). It has about twenty-two participating patent offices and its main aim has been to develop information retrieval systems capable of facilitating access to patent documentation, as far as possible through the use of computers, and to facilitate search and examination of patent documents by improving standardization. After starting with several working groups, it finally settled down to a search systems committee (TCSS) and a standardization committee (TCST). The TCSS devoted its efforts to producing search systems outside the orbit of the IPC classification systems, and there were mainly complicated deep-indexing systems, developed by international co-operation in areas such as alloys which lend themselves to systems of five sub-division and computer searching. For example, for alloys indexing terms for the various constituent metals in various combinations and for their percentages can be elaborated in fine detail so that a search for any given combination of features will only reveal a small number of documents having this particular combination. The theory of the ICIREPAT 'Shared Use Systems' as they are known is that various countries index their own documents on the international ICIREPAT indexing system (which is adopted as part of each of the separate national classification systems), and punch the information on punch cards which are then sent to the co-operating offices for feeding into their computers, thus avoiding reclassification by one office of another office's documents.

Elaborate arrangements were made to monitor the work and achieve consistency of indexing. This has been an enormous international effort but the results to date have been disappointing (a) because of the effort involved in reclassifying the back-log of documents in search files on to the system and (b) because of the difficulty of revising these complicated indexing schedules to keep pace with changing technology. In addition to developing these 'Shared-Use Systems' the TCSS produced standards for layout of punched cards, index coding sheets and magnetic tape formats.

The work of the ICIREPAT standardization committee (TCST) dealing with standardization of patent documents and associated matters is probably more familiar to you. This committee has produced standards on:

—Format and size of patent documents
—Designating calendar dates
—Country codes (two letters, *e.g.* GB)
—Microforms
—Recording of Int Cl symbols on machine-readable records
—INID codes (ICIREPAT numbers for identifying data)
—Layout of first page of patent documents
—Guidelines for preparation of abstracts
—Guidelines for titles on patent documents
—Codes for identifying different kinds of patent documents (*e.g.* 'A' for first publication of unexamined application).

Their work on standardization is still continuing, the main matters concerning them at present being coding of entries in patent office gazettes. The result of their work has been very valuable in facilitating the understanding of foreign documents and enabling the important information (especially bibliographic) to be easily recognized.

PCT

Finally the Patent Co-operation treaty, administered by the PCT Union (another WIPO body) was concluded in 1970. I understand you have recently had a talk on the PCT but I would like to mention that the main effect of this so far as documentation is concerned will be the designation of international search authorities which will carry out searches through all the PCT minimum documentation and this is again providing a powerful incentive to international co-operation on documentation.

PCPI

The result of the growth of these bodies was that WIPO was administering three technical bodies (IPC Union, ICIREPAT and PCT) all concerned with patents and with rigid distinctions between each but whose responsibilities in certain areas overlapped. This was particularly the case with ICIREPAT and IPC where the former was restricted to non-classification search systems whilst the IPC was restricted to a pure classification system. In certain areas a mixture of classification and indexing systems can increase search efficiency but it was almost impossible to have effective co-operation between IPC and ICIREPAT.

Moreover in the standardization work it was realized at times that IPC, ICIREPAT and the PCT/TCC were all considering the same matters.

In 1978, in an effort to co-ordinate and remove overlap of work between the three bodies, the WIPO Permanent Committee on Patent Information (PCPI) was set up to deal with all patent information matters, *i.e.* standardization matters, classifying and indexing systems, search system matters generally and other matters of concern to users of patent documents.

Thus the old organization of the three WIPO bodies (IPC, ICIREPAT and PCT/CTC) in three separate watertight compartments has been altered to the following:

—SIG or its sub-groups will deal with all search system matters, *i.e.* IPC revision, hybrid or deep indexing systems for association therewith, search, classification and revision guidelines.

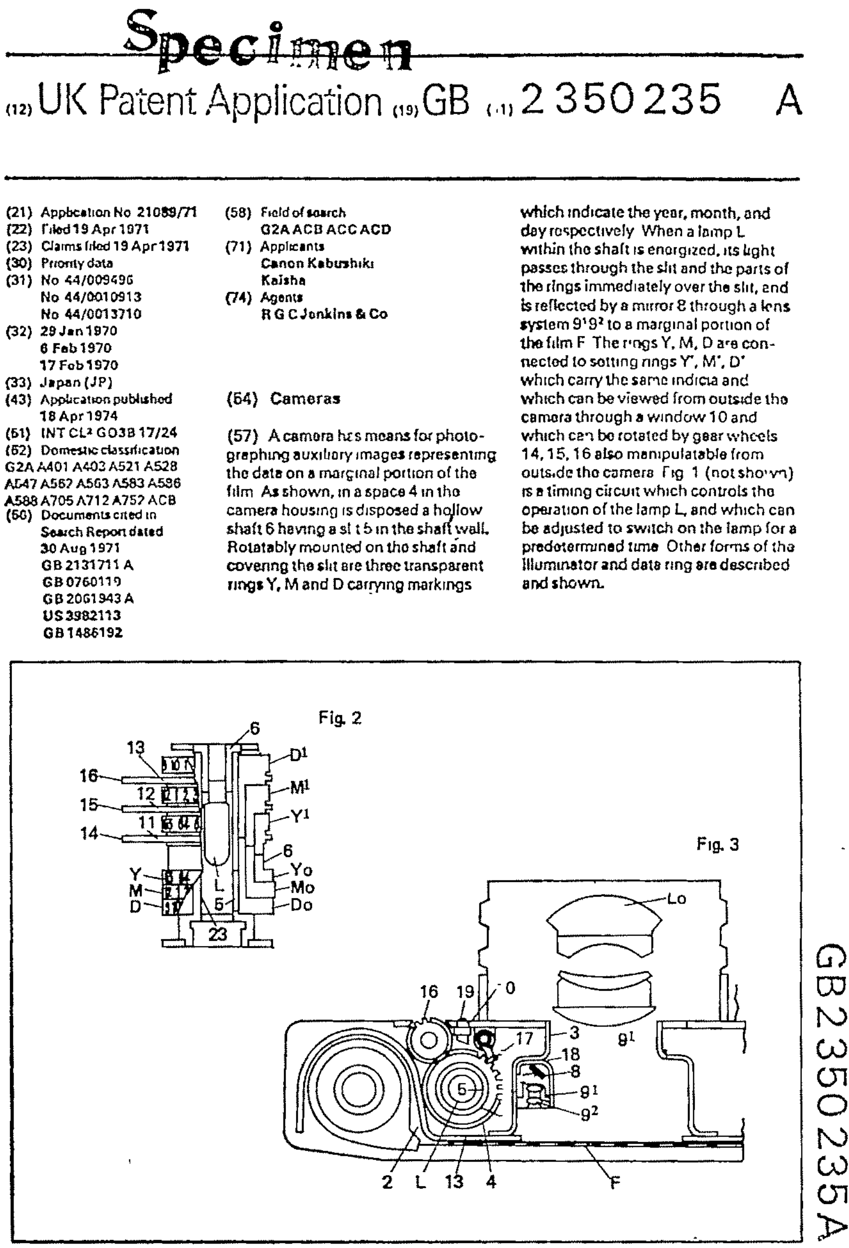
—GIG will deal with standardization matters and general matters not related to any specific technology.

—DIG deals with patent information matters of particular interest to developing countries, *e.g.* training needs, identifying needs of users, special guides to IPC, etc. This was an existing committee under another body which requested to become a working group of PCPI.

PCPI welcomes suggestions for tasks from all interested organizations, particularly user organizations, because it was felt that the previous WIPO structure did not pay sufficient attention to the needs of users. Your own international organization, FID, has observer status along with other organizations such as ISO, INPADOC, UNIDO, OECD, EEC, etc. All work submitted to the PCPI is vetted by the Planning Group which decides whether the work is justified, what should be its priority, and which working group should deal with it. The new organization is at a very early stage and matters are in a state of transition so it remains to be seen whether the new organization operates more efficiently than the old.

Turning now to the participation of the UK patent office in international affairs, so far as the IPC goes we have supported this international venture fully from its inception and taken part in all the revision work. We do not use it as a search system at present because our domestic system was at a high stage of development before the IPC began and, with revision of our system every fourteen months or so, has kept pace, in our opinion, more successfully with changes in technology. Nevertheless the ideas absorbed from work on the IPC have had their effect and in many areas our domestic system is changing to a classification basis, supplemented where necessary by simplified indexing systems. Such a system has advantages in conducting a search for obviousness, as called for by our new Act operative from 1st June 1978, as distinct from a pure novelty search, which was all that was required under the old, 1949 Patents Act. Moreover a classification system in general reduces the effort of classification and reduces the number of documents filed and will have big advantages if and when the domestic search is extended to foreign documents.

We have also been very active in the ICIREPAT work, both the search system side, where we helped to produce and monitor many of the ICIREPAT shared



Specimen

(12) UK Patent Application (19) GB (11) 2 350 235 A

(21) Application No 21089/71
(22) Filed 19 Apr 1971
(23) Claims filed 19 Apr 1971
(30) Priority data
(31) No 44/009496
No 44/0010913
No 44/0013710
(32) 29 Jan 1970
6 Feb 1970
17 Feb 1970
(33) Japan (JP)
(43) Application published
18 Apr 1974
(51) INT CL² G03B 17/24
(52) Domestic classification
G2A A401 A403 A521 A528
A547 A562 A563 A583 A586
A588 A705 A712 A752 ACB
(56) Documents cited in
Search Report dated
30 Aug 1971
GB 2131711 A
GB 0760119
GB 2061943 A
US 3982113
GB 1486192

(58) Field of search
G2A ACB ACC ACD
(71) Applicants
Canon Kabushiki
Kaisha
(74) Agents
R G C Jenkins & Co

(54) Cameras

(57) A camera has means for photographing auxiliary images representing the data on a marginal portion of the film As shown, in a space 4 in the camera housing is disposed a hollow shaft 6 having a slit 5 in the shaft wall. Rotatably mounted on the shaft and covering the slit are three transparent rings Y, M and D carrying markings which indicate the year, month, and day respectively When a lamp L within the shaft is energized, its light passes through the slit and the parts of the rings immediately over the slit, and is reflected by a mirror 8 through a lens system 9¹9² to a marginal portion of the film F The rings Y, M, D are connected to setting rings Y', M', D' which carry the same indicia and which can be viewed from outside the camera through a window 10 and which can be rotated by gear wheels 14, 15, 16 also manipulatable from outside the camera Fig 1 (not shown) is a timing circuit which controls the operation of the lamp L, and which can be adjusted to switch on the lamp for a predetermined time Other forms of the illuminator and data ring are described and shown.

FIG 1: *The front page of the new Act documents*

systems, and on the standardization side. We adopt the ICIREPAT recommendations to the maximum extent possible consistent with the particular needs of our search system.

New Act changes

The new patents Act has necessitated radical changes in the actual form of the patent documents which the UK office will issue. On the old Act the specification was not published until the application had been fully examined and accepted as meeting all the provisions of the Act. Under the new Act publication of the unexamined application will occur eighteen months from the priority date of the application, after the application has been searched but before the substantive examination has taken place. This first publication of the unexamined application will be denoted the 'A' publication in accordance with the ICIREPAT standard and will have a serial number in the 2,000,000 series. After substantive examination the specification, usually amended as a result of the examination, will be republished as a 'B' document with the same serial number, this document being the specification of the granted patent. These will be the main publications. There is provision for a 'C' document if the 'B' document is reprinted after considerable amendment as a result of a revocation action but these should be relatively few in number.

Considerable changes will also occur in the front page of our published patent documents. Until now the front page carried the bibliographic data in a small area at the top, underneath which the description began.

These old Act documents were all published after examination of the application and show the accepted form of the specification on which the patent grant was made. Separately from each of these specifications was published an abridgement or digest of the subject matter of the specification. These were prepared by the examiners and published weekly as abridgement pamphlets (in serial order) which were subsequently published in abridgement volumes. For search purposes each specification was mounted on an A3 size search card of stiffish cardboard along with its associated abridgement. These search cards are unique to the UK and one of the best search tools in the whole world-wide patent system. Along the top of the card are arranged clips indicating the indexing codes of the classification system and on a card this size, using coloured and bicoloured clips, up to 200 codes can be accommodated so that searches on single codes or combinations of codes can be accomplished easily by scanning each card and picking out the appropriate clips. The system has two great disadvantages: the search cards are bulky and very costly to prepare.

New front page

The front page of the new Act documents has been completely redesigned (Figure 1). The heading is simpler with each element denoted by the appropriate INID code. The bibliographic data is arranged in a column at the left, each item being indicated by its INID code, and carries additional matter compared with the old specifications (*e.g.* item (56) gives the results of the search, (58) gives the field of the classification searched). At the top is an abstract prepared by the applicant not the examiner; the examiner's function is merely to edit this abstract, not to write it. These abstracts are intended to be limited to about 150 words. In the bottom half of the page is the drawing. The spaces for the various items (data, abstract, drawing) can be varied to suit individual cases.

This new front page is similar to the US front page but differs slightly from the EPO and PCT front page. This is one area where we depart from the ICIREPAT recommendation which recommends an upper part for bibliographic data and lower part for abstract plus drawing. This leads to rather small drawings not very suitable for searching and we felt the arrangement we have adopted gives a much larger area for drawings and is a much more flexible arrangement. We are in the process of trying to get the ICIREPAT standard changed to embrace our layout and that of the US—rather a cheek on our part since we are such recent converts to this type of front page!

Search files

This new front page has important advantages for search file purposes. In a considerable percentage of specifications, *i.e.* for files with no indexing codes, the search card merely provides a device to associate the abridgement with the specification. Now that the abstract appears on the front page, the search card is superfluous and the document can be filed loose as it stands. This accounts for up to 30 per cent of our documents and will result in an enormous saving of space, since a loose document collection occupies only about one-third of a search card collection. This technique can be extended by clipping specifications in files having up to thirty indexing codes on a thin oversize A4 backing card, the top of which has a pre-printed 10 × 3 grid accommodating up to thirty codes. This accounts for about another 40 to 50 per cent of our specifications and represents another enormous saving of space. For the present the remaining 20 to 30 per cent of specifications will continue to be mounted on A3 search cards but with further revision of the classification system it is hoped to reduce this still further.

The present plans are to include all the 'A' documents (published unexamined applications) in the search files as soon as they are published. The 'B' documents (examined specification) will be in most cases a repetition of the 'A' document but with amended claims and in some cases some subject-matter deleted as a result of anticipation by the documents found in the search. These 'B' documents will not in general be included in the search files, unless the examiner decides for some reason that the 'B' document is more valuable for search than the 'A' document.

EPO and PCT published applications (*i.e.* their 'A' documents) will be incorporated into our search files in similar manner to domestic specifications. The EPO granted patent (*i.e.* 'B' document) will not in general be included in our search files unless special considerations in individual cases demand it.

PCT applications which designate the UK after publication will enter the domestic system for substantive examination. They will be given an application number (like any other domestic application) and a serial number in the 2,000,000 series and a front page corresponding to that number will be published along with the English translation of the document if it is in a non-English language. This front page will be included in the abstract volumes and will include the bibliographic data and the UK classification, since it will be reclassified into the UK system. After substantive examination an appropriate 'B' document, as with any other domestic application, will be published which will either be associated with or replace the published PCT application. In general, the principle will be to put only one of a 'family' of specifications in the search files and where possible it will be an English language specification, either the UK one or the earliest published English language specification.

Another area undergoing change is the Abridgement pamphlets and volumes which we publish and which I am sure appear in many of your libraries. These are a very valuable aid to searching not only for examiners but for public users wishing to investigate a certain area of subject matter, because the specifications are arranged in a classified order. At present the abridgements are published in a series covering 25,000 specifications. They are arranged into twenty-five abridgement units, each of which covers from one to three divisions of the classification key. (The key has eight sections A . . . H, each divided into divisions A1 . . ., B1 . . ., etc.) The pamphlets appear weekly corresponding to the specifications published that week. At the end of a series the pamphlets are bound into volumes corresponding to the abridgement units, the twenty-five volumes covering the 25,000 specifications in the series. Within each volume are provided subject-matter indexes and name indexes so that it is easy to look up, for instance, all the specifications classified on a certain indexing code of the classification key, or all specifications under a particular applicant's name. The series 1,500,001 to 1,525,000 has just ended and the present series will continue to the end of 1978. The abridgements are on special size paper, smaller than A4.

From 1st January 1979 the pamphlet service will cover abridgements of old Act cases and abstracts of published new Act applications, abridgements being separated from the abstracts, and both being printed on A4 size. The abridgements will be arranged as now in serial number order with the subject matter of the headings covered by the abridgement unit intermingled. The abstracts on the other hand will merely consist of a copy of the front page of new Act specifications and since new Act applications will be sorted into primary heading order before numbering (instead of random numbering as now) the abstracts will be in consecutive number order in each heading. Hence in both pamphlets and abstract volumes the new Act publications classified in a given heading will all be together, further facilitating searching of subject-matter falling within a given heading of the classification key. This we hope will be of considerable assistance to public users of patent documents. Gradually over the next few years the abridgements will fade out so that the volumes will eventually consist entirely of abstracts. In view of the greater amount of bibliographic information on the abstract pages (compared with abridgements) and their arrangement in heading order, we are hoping for increased sales of these pamphlets and volumes.

One final area where we are falling into line with the ICIREPAT recommendation is in the numbering of applications. Formerly our applications were numbered 12345/78. From 1st January 1979 all applications will be numbered in the form 7912345 or 7900045, the first two digits representing the year and the next five the application number. This is also applied to 1977 Act applications as from 1st June 1978.

Looking to the future, the problem of accommodating bigger and bigger document collections, and the increasing difficulties of searching, seem to loom very large. Efforts to meet the problem being made in various offices include:

(a) Microfilming old and little-used search files to save space. Extension of this to frequently used files is very doubtful due to the strain on examiners having to spend considerable time searching.

(b) Eliminating family members. Many patent applications are repeated in several countries so that large savings of space can result in only keeping one family member in search files. This is even more effective if the remaining family members, kept in a remote store, can be readily identified, *e.g.* on a computer, so that the earliest published member of a family can be consulted when necessary.

(c) Computer searching. This appears to have limited applicability. Initially there were great hopes for computer searching but its use is limited to areas where deep indexing techniques are applied and these are losing favour because of the large amount of time which has to be spent on indexing each case on such systems. Otherwise the computer only prints out a long list of documents falling within a classifying pigeon hole and this is more tedious than manual searching. The US office is experimenting with a system called CCMS—computer controlled microfiche searching. Basically patent documents in a search file are photographed on to microfiche which are arranged on carousel according to the classification system of the file. By keying a combination of the indexing codes on a terminal, a computer displays the numbers of specifications carrying these codes and when required the corresponding microfiche are selected and displayed on a screen. The system is interesting but expensive and apparently of limited application. Other computer techniques, such as searching on key words in titles and descriptions, are at a very rudimentary stage and do not at present look very promising.

It is possible, as document collections grow and searching becomes more and more expensive, that searching will tend to be more and more concentrated in a small number of international search authorities, if these prove to be efficient. Already several offices entrust their searches to the former IIB at the Hague (now part of the EPO) and this could be an increasing trend, particularly for small offices performing only a small number of searches each year. The upkeep and maintenance of a very large document collection and a complicated classification system can only be justified economically by a high rate of search activity; in the absence of this, the cost per search becomes prohibitive. It therefore seems to me that the need for international co-operation in documentation matters will increase, not diminish, in the foreseeable future, but the outcome eventually may be an international system used and maintained by a few super international searching organizations.

User evaluation by budgetary games

C. C. Parker

Information Officer, Physical Sciences and Engineering, University of Southampton Library

Based on a paper presented at the On-line Meeting of the Aslib Transport and Planning Group, Southampton, 13th April 1978

This paper describes a relatively new budgetary game technique which may be used to evaluate library and information services. It describes a particular application of the technique to research workers at Southampton University in which the relation between the Library and other University support systems was investigated. The results indicated that according to the users, the value placed on library services held up well in conditions of budgetary restraint. An extension of the game technique applied to type of library and information service, indicated that interactive services were more highly valued than active services.

A problem

ONE OF THE PROBLEMS with simply asking people what kinds of facilities they would like, is that their answers are often qualitative and not quantitative. They say they need something, but not how much. This problem may be partly solved by using ranking methods or by supplying a range of possible answers from critical need to casual need, but even then, there is still a sense of unreality and lack of perspective, and the respondent may be able to act like a millionaire on a spending spree. The real life choices are made in a complex market place where there are all kinds of interactions and restrictions. Any data obtained from investigations which do not contain an element of these interactions and restrictions may be highly suspect, and should be interpreted with great care, especially when it is to be used as evidence for the introduction of commercially viable services.

The classic example is when a market survey is run, and people say that they want a product or service, even at a given price, and then when that product or service is made available, interest suddenly evaporates. The difficulty then is to measure, as realistically as possible, the effective *strength* of their want or need. This paper sets out to introduce a relatively new technique which goes some way towards overcoming the difficulty. Of course, when dealing with people, one has to accept that any investigation is susceptible to all sorts of variables, such as day to day changes in their work situation, whether or not they are in a hurry, to even what was eaten for breakfast that morning.

Some available methods

(1) *Pilot launchings*

Probably the most reliable method of all is to launch the product or service in a limited way, with or without a subsidy, to see whether people take to it or

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not. This can, of course, be extremely expensive, and may only indicate one stage in a continually changing demand. Some of the computerized information service providers have adopted this method to evaluate demand and to educate their potential users.

(2) *Ranking order methods*

In the simplest form, these involve placing (or ranking) a list of items in order of preference. A more sophisticated technique involves considering every possible pair of items from the list, choosing the preferred one in each pair, and computing a single order of preference.

There are two main problems with this approach. First, it is principally qualitative rather than quantitative. It may suggest that one item is desired more than another, but not by how much. Secondly, the answers from one person cannot be directly compared with those from another. It is not possible to derive a simple 'average' answer for one item on the list so that the answers from two groups of people can be compared.

It is possible to compare sets of answers statistically,[1] using Spearman's coefficient of rank correlation for two sets, and Kendall's coefficient of concordance for more than two sets.

(3) *Rating scale methods*

In the simplest form, these involve giving each item on a list of items a score from a given scale of values, *e.g.* 0–3 or 1–10.

There are a number of problems with this approach. Although it may improve the overall quantitative analysis it loses the fine qualitative measure of ranking methods. For example, if say three items are each given the same score in a scale 0–10, they may well have had slightly different scores in a scale 0–100.

Furthermore, when it is wished to compare one set of answers with another, or 'average' the answers, the same sort of problems occur as in ranking order methods. One person's '3', from a scale of 0–5, might not equal another person's '3'. One way round this is to 'normalize' each person's results by dividing each answer by the total from all his answers and then multiplying each result by the total number of questions. Thus if a person answered 5 for one item out of say 10 and the total from all the answers to the 10 questions was 25, then the normalized answer would be $5/25 \times 10 = 2$. This method assumes that everyone's totals are effectively equal. Another method is to upgrade all the answers where necessary so that everyone scores the maximum of 5 in at least one question. Thus if a person's highest answer is 3, all his answers are increased by 2. This assumes that everyone's highest scores are effectively equal.

Value scales of the kind 0–5 are almost certainly not effectively linear. If they were linear then one '3' and one '2' should together be equivalent to one '5'. In an experiment with library staff using the 0–5 scale for grading the importance of household appliances, and using a trade-off technique, we found that our 0–5 scale was not linear, *i.e.* 0, 1, 2, 3, 4, 5, but effectively of a doubling nature, *i.e.* 0, 1, 2, 4, 8, 16. So that an answer of '5' on our scale would probably be equivalent to two answers of '4' on the same scale. Even this may be an over-simplification and our scale may effectively have a zero at one end and an infinity at the other.

One way round this is to use a formula of the type:

$$\frac{(\text{Score})^n}{(5-\text{Score})^n}; \quad \text{where } n = 1 \text{ or } \tfrac{1}{2}.$$

Several advisers had suggested to us that results would be biased away from the ends of the scale because people disliked extreme answers. We found the reverse to be apparently true; people said they disliked being typecast as average.

(4) *Trade-off budgetary game methods*

As mentioned, there are restrictions and interactions between the products and services in a real life market place. If you have a good housekeeper you may not need an *au pair*; you may also not be able to afford both! Trade-off and/or budgetary game methods attempt to take into account both interactions and restrictions, and provide a perspective which is frequently lacking in ranking order and rating scale methods. They are described below.

The priority evaluator

One survey method which restores some of the perspective is the 'Priority evaluator approach' developed by Gerald Hoinville[2] at Social and Community Planning Research. The basic idea is to give interviewees a budget and then allow them to spend it on a given number of amenities or variables in such a way that they can trade off the excellence of one amenity against the excellence of another. For example, the choice could be made between a playground with:

6 swings and 2 roundabouts
or
12 swings and 1 roundabout

In this example one has to trade off the number of swings against the number of roundabouts. If we were to play a very simple budgetary game for this situation, we would have to price or cost both swings and roundabouts. We can refer to the swings variable as a support system for the playground situation and then have various levels of support depending on the number of swings:

Swings System:
2 swings = low level = no cost
6 swings = medium level = 1 cost-unit
12 swings = high level = 2 cost-units

We can do the same for the roundabouts:

Roundabouts System:
1 roundabout = low level = no cost
2 roundabouts = medium level = 1 cost-unit
3 roundabouts = high level = 2 cost-units

If we are given a budget of 2 cost-units we could spend it one of three ways:

(i) 2 swings and 3 roundabouts
(ii) 6 swings and 2 roundabouts
(iii) 12 swings and 1 roundabout

Most situations that are investigated have more than two variables. For example Hoinville used eight variables in one commuter study:

—degree of crowding
—waiting time
—reliability of transport
—walking time
—number of interchanges
—frequency of getting a seat
—journey cost
—travelling time.

The numbers of possible combinations increases with the number of variables and levels. For eight variables, each with four levels, some 3,000–4,000 combinations are possible depending on the price structure adopted.[3] Hoinville has used pictures to describe the variables and their different levels. Pictures can give an undesirable bias if, for example, you use a country scene to depict quiet living conditions and a town scene to depict a noisy one. The additional variable, town versus country, has been introduced. For a detailed examination of this method, the original work of Hoinville may be consulted. It should always be remembered that this is a relatively recent technique and still in a state of development.

Other methods include combinations of ranking order, rating scales and trade-offs. For example, one trade-off method[4] requires people to rank fixed combinations of the systems or amenities at varying levels. Thus if there were two services say, library (low, medium and high levels of service) and canteen (low, medium and high levels of service) then there would be nine possible fixed combinations to be ranked in order of preference. Special approaches, such as pairwise combinations, have to be used because of the massive number of possibilities with multi-system situations. The end product, obtained via computation, is a fixed 'utility' for each level of each amenity. These can be summed for the various situation permutations, and used to predict a favoured situation. This method appears to rely on the utility of each level of each amenity remaining constant in the different situations.

Computer programs are widely used to cope with the vast amounts of complicated data obtained from surveys. Probably the best known of these is the 'Statistical Package for the Social Sciences'[5] which is a system of computer programs that has been developed and proved successful in analysing a great variety of survey statistics. For example there is a subprogram for computing the Spearman and Kendall rank-order coefficients mentioned earlier.

Photocopying *versus* inter-library loans service

One possible but oversimplified example of the application of the trade-off technique to library services is given below.

Suppose, for example, that your library was running into difficulties with the cost of both its Photocopying and Inter-library Lending Services, and you were given a fixed budget to cover both, say £2,000. Assume that either Photocopying or ILL demands could independently just about use up the allocation, and that at the whim of upper management this £2,000 was earmarked for these two services in complete isolation from other budgetary demands. In this situation, this is the type of game you could play with a sample of your library users.

The two services are displayed on a games board (Figure 1) each with three options: zero/poor, or moderate/good or very good/excellent. Each option for each service is costed as realistically as possible relative to the others and relative to options in the other service. In this simplified case each (£) represents £1,000, but there is no need to let the user know the amounts involved.

The first step is to get the users to describe each service in their own way to make sure that they fully understand what it involves. Ideally they should be checked on their understanding of each option for each service in the same way, and the results recorded on the games board itself. Bear in mind that the two have effective overlaps, *i.e.* you may obtain photocopies from the British Library Lending Division (BLLD).

The first question to each user is to ask about their existing situation, for instance they might currently enjoy both moderately good photocopying and inter-library lending services. This gives the foundation stone, as it were, or reference point for the rest of their answers. It may be helpful to distinguish between the potential of each service and the actual amount of use made of it. They may have a good photocopying service available, but never use it.

The second question is to ask about which options they would choose with no restrictions except that of realistic need. As just suggested they could, perhaps, choose to have a first-class photocopying service available but never use or really need it. Insurance is, quite possibly, a neglected variable in understanding information handling habits!

The third question, to complete the background, is to ask about the previous experiences of the users. Have they experienced very good services, or poor services, or both?

Having established this background, preferably recorded on the games board, both for analytical purposes and for the user's benefit, budgetary games can be played. In the example given the choice is very simple; if the users fully allocate their budget in trading off the level of one service against the other, then they have three choices for the 2 × (£):

—Poor photocopying/Very good ILL
—Poor ILL/Very good photocopying
—Moderate photocopying/Moderate ILL.

If the budgetary choice results in an improvement on or a deterioration of an existing situation, the user can be asked specific questions about this, for example: What was he spending more money on, and why?

Ordinary questionnaire or interview techniques may be employed to investigate user variables or attributes, such as age, work, personality, etc., and then these may be correlated with, or used to interpret, the budgetary game results.

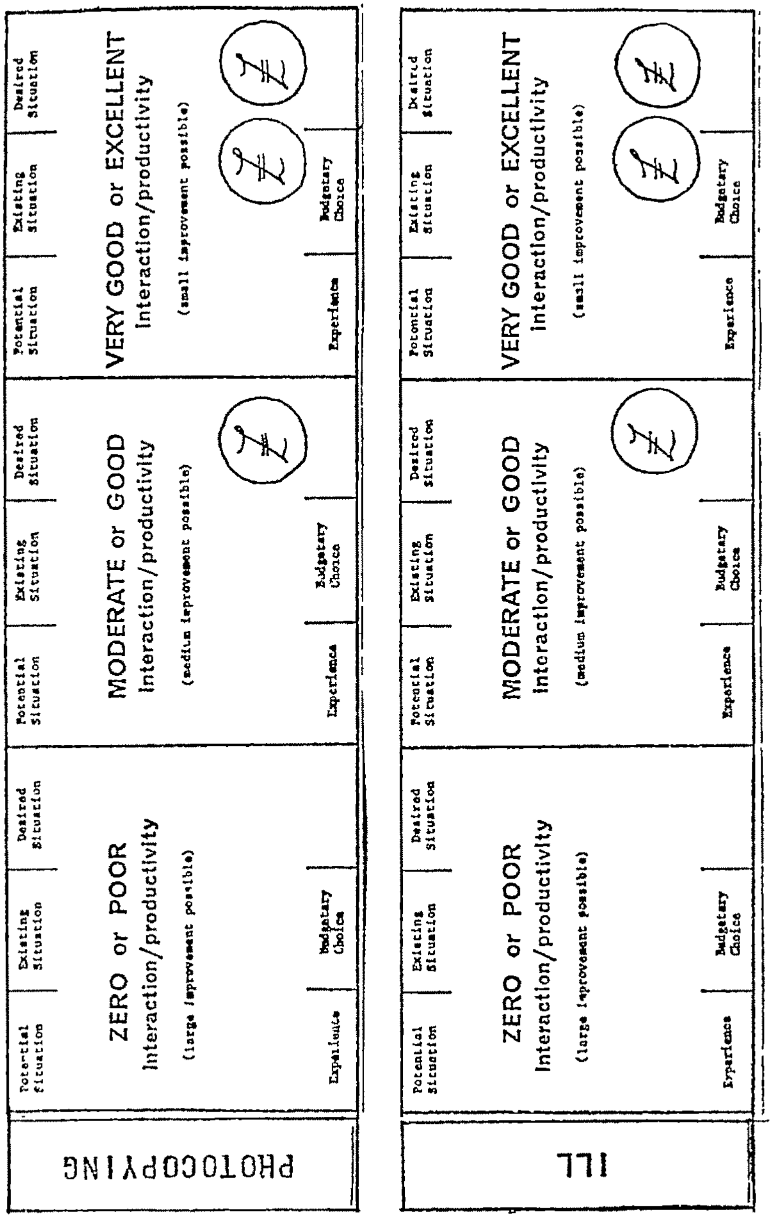

FIG 1: *Photocopying* versus *inter-library lending*

The library *versus* the rest

The actual work done at Southampton was as much concerned with developing and investigating the application of the method as in obtaining useful results. The main game played at Southampton was used to try to see the library in true perspective in relation to other university facilities. There is little point in worrying too much about which particular library service should be improved, if the whole library system is of relatively low importance. Happily this was not the case as you will see.

In this game there were fourteen 'support systems' as opposed to the two services in the example game described earlier. These were:

—Personal library/Records
—Equipment/Materials
—Accommodation
—Instructional course system
—Research and contract system
—Secretarial/Clerical system
—Scientific/Technical assistance
—Departmental/Group libraries
—Non-group colleagues
—Main library
—Computation facilities
—Outside personal contacts
—Outside organizations and staff
—Conferences, seminars, etc.

Each system had three levels, with the two higher levels carrying valuation or cost units in a similar way to the example given earlier. One of the budgets used was obtained by 'costing' the sum of all the 'existing situations' and reducing this amount by 20 per cent. Users could simply cut back some services or completely rearrange their options.

Figure 2 shows the different cut backs or improvements in the levels for the fourteen support systems in the overall 20 per cent cut back situation. Each cut back or improvement is the difference between the average 'existing situation' and the average 20 per cent cut back budget situation.

As can be seen, the library holds up quite well; in fact the cut back was only 10 per cent. The interesting thing was that accommodation was cut right back, but computation was improved, despite the fact that in the non-budgetary free choice the average level chosen for accommodation was higher than for computation. This showed quite clearly that the preference for better computation was quantitatively stronger than for better accommodation, in a cut back situation.

Users were also asked an extensive set of questions concerning their work, for example, how they spent their time, what was important to them, what caused difficulties, what stage were they at in their work and so on. Their answers permitted correlations between work variables and the budgetary game results, for example, professors budgeted an average of at least twice as much on secretarial support as any other grade of staff; those users whose main activity was personal research budgeted an average of nearly twice as much on

This chart shows the different cut backs in level and expenditure* for the fourteen university support systems in an overall 20% cut back situation. Each cut back is the difference between the average 'Existing Situation' and the average '20% Cut Back Budget Situation'. (*cut backs in level are not proportional to cut backs in expenditure because some systems are more expensive than others.)

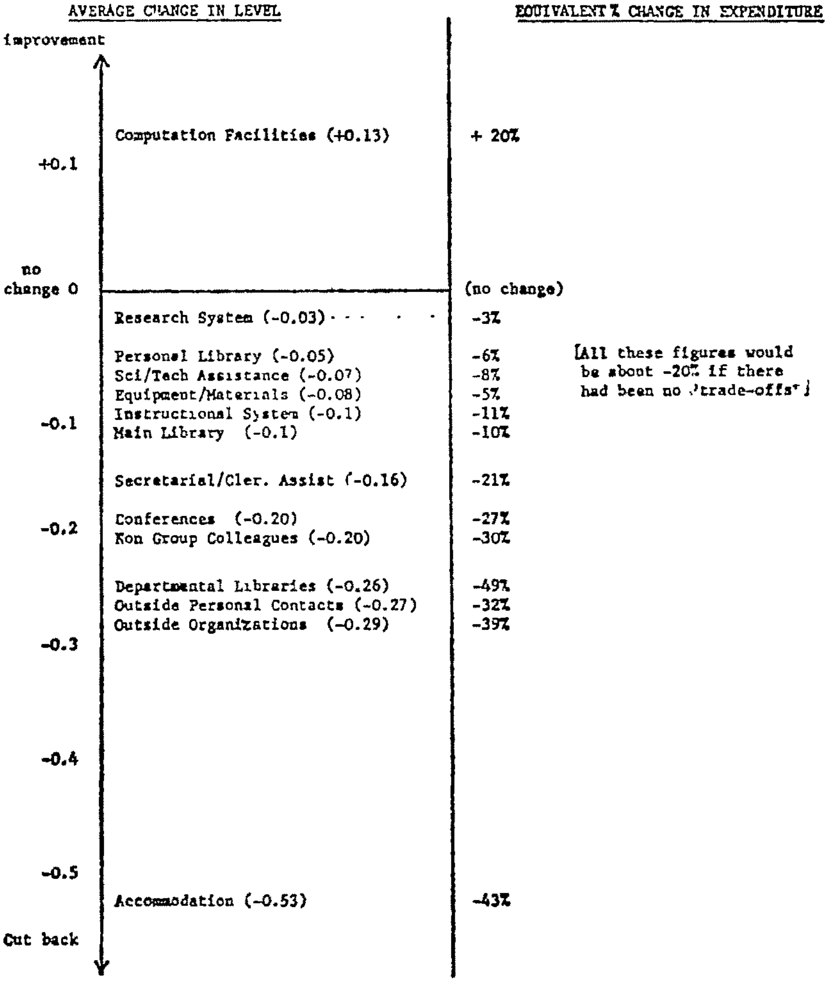

FIG 2: *Cut back of university support systems*

personal libraries as those whose main activity was administration. Somewhat obvious results, but they did show that the game worked.

Passive, active and interactive services

At the time this work was being done, there was a particular national interest in the concept of interactive services, especially computerized ones. We were asked to carry out a separate budgetary game, just to cover formal library and information services. The services were simply divided into three types, passive, active and interactive, and as with all classifications, hindsight showed there was a certain amount of folly in this choice. There were inevitable difficulties, mainly in conceptualizing widely differing individual services under one umbrella heading, such as with open access libraries and on-line information services both grouped together under interactive services.

Basically, passive services were those where it was known fairly precisely what was wanted, and the service responded to each request by supplying a book or references or information—the British Library Lending Division would come under this heading. Active services were of the standing order type, with distributions, circulations, SDI, etc. Interactive services were those that included the browsability factor—such as on-line data bases and open-access libraries. Each of the three services had three levels as before, and in each case the middle level was valued at 2 units and the high level at 3 units.

For this game there was a fixed budget of 5 units which effectively forced users to choose a different level for each type of service—they could not opt for the medium level in all three. As in the main game, if users used their budget to improve on their existing situations, they were asked what improvements they had in mind.

The overall results are shown in Figure 3, where it can be seen quite clearly that the budgetary restraint singles out interactive services as being the most desirable and active the least. If we compare the two groups who budgeted for the high-level passive and interactive services, we find that the passive service people are biased to the professorial grade and a longer time in their subject field, whereas the high-level interactive people were biased towards the lecturer grade and newcomers to their subject field. The group that budgeted for a high-level active service tended to be working in more unpopular subject fields and subject fields which lacked well-tried historical foundations.

On-line users *versus* the rest

For the purposes of this paper those users in the group that had budgeted for improvements in interactive services, *and* had specifically suggested on-line services, were analysed as a separate group. To put this sub-group in perspective, out of a total of seventy people, thirty-five wanted improvements in the interactive services, and out of these, thirteen specifically suggested improvement in on-line services. This on-line sub-group was found to contain four times as many people at the information searching/reviewing stage of their work than the rest, and three times as many people who were known to have been involved in mechanized information services as the rest.

Their work seemed to involve less giving of formal advice and more production of books, reviews, papers, etc. (which were not part of specified research or teaching duties) than the rest, and twice as many of them used published data as the rest.

To summarize, we can say that the people who would appear most likely to use on-line services are those who are more involved with the published literature, those who have already had some involvement with mechanized services,

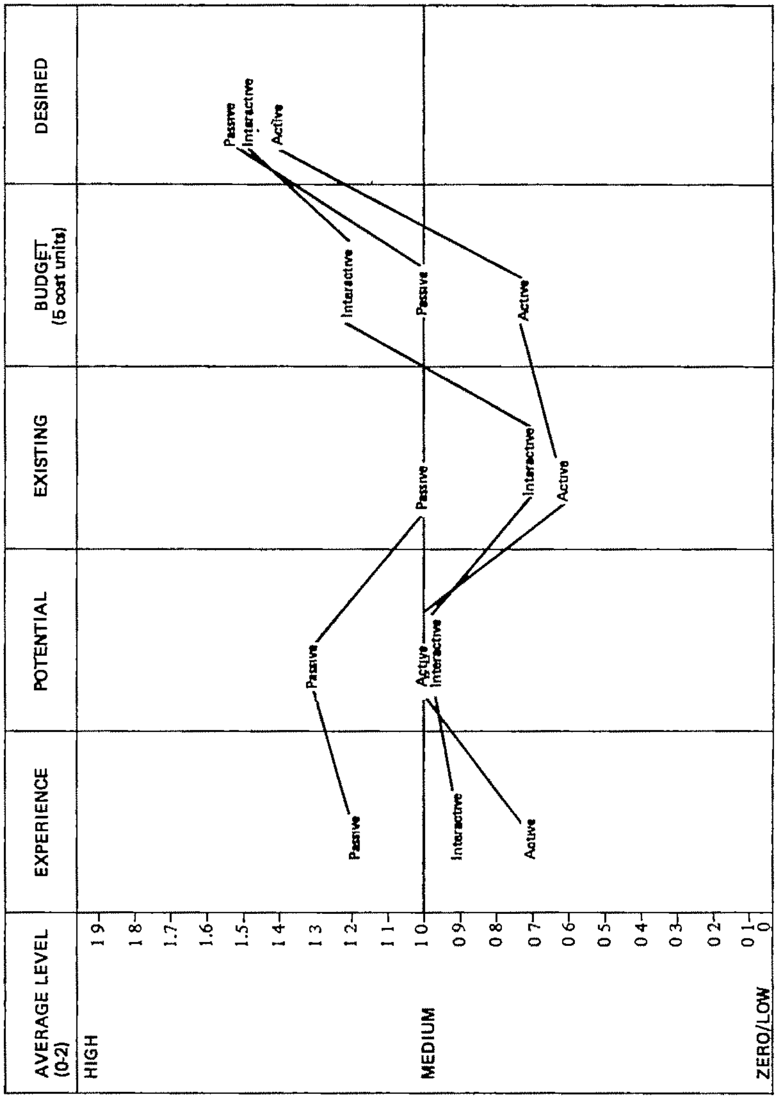

FIG 3: *Information services*

and especially those who are at an information searching/reviewing stage of their work.

Conclusion

Although many of the results obtained by the budgetary game method were, perhaps, to be expected, it does seem that this technique has a real application in the library and information field. The relatively high valuations of the University Library and 'personal libraries' compared well with an earlier rating scale survey which appears in the full report.[6] With considerable care, possible new services may be introduced into a game, which permits the method to be directly applied to the future as well as to the present, bearing in mind that anticipation is not the same as realization.

The practical details of the sampling, the game playing and recording, and the criteria used in choosing the various systems are recorded in the full report.

Having established the position of the University Library in relation to other support systems, it would now seem reasonable to extend the budgetary game technique to evaluate the various library services (existing and proposed) in relation to each other. The results could then be used in financial control models of the type proposed in the PEBUL Report.[7]

It may be that the technique is particularly suited to the 'TV game' approach, which would have considerable advantages. It was certainly a method that was appreciated by the interviewees and players. From the interviewer's point of view, it might also provide some entertainment. For example, almost without exception, those people who maintained they were very short of time, took the longest time to play the game and be interviewed!

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The potential of the microprocessor in library and information work

P. W. Williams

Computation Department, UMIST

Paper presented at an Aslib Midlands Branch meeting, Birmingham, 26th October 1978

The advent of the microcomputer has changed dramatically the cost of computing power. Not only has the cost for a specific capability decreased substantially but also the cost for a small system is now measured in hundreds of pounds rather than many thousands. The cost and capability of these new systems are reviewed and suitable applications are discussed. The use of a microcomputer for assisting effective use of public on-line information systems is described. Possible applications in a library environment are surveyed and recommendations are given on the tasks which are most suitable for the use of microcomputers.

The revolution in computer costs

THE CHANGES IN computer technology over the last two years have been so fundamental that the potential applications of computers must be completely reassessed. The significant developments have not been in the method of use of computers, nor in the type of components, but simply in the cost of construction. The effect of this dramatic change in the costs of the basic units of a computer has been to make them available in a vast number of areas where previously finance has been too limited. It has also meant that the structure of a computing machine or a network of computers must be rethought, but this is not of primary interest in this paper.

The magnitude of the change can be summed up in the figures £20,000 for a small minicomputer, £2,000 for a complete computer package based on the use of a microprocessor, and £200 for a microcomputer built by a do-it-yourself computing enthusiast. These figures are, of course, oversimplified but give reasonable figures for the order of magnitude involved.

The figure for the minicomputer is rather low and if substantial disk and tape storage is required the figure will rise to £40,000 or more.

The figure for the microcomputer package could well be more than is required for a particular application. It is now possible to purchase in the UK for just under £500 a full keyboard of typewriter dimensions with a microprocessor, a visual display unit, and a cassette tape recorder for secondary storage. This machine has a computer language of medium level provided within the system so that some of the routines which need to be carried out have been pre-programmed. It also has approximately 4,000 storage locations for the program and the data which allows programs of moderate size or data requirement to be executed. A more advanced version is available with 16,000 storage locations and a much higher level of pre-programmed routines for around £800.

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If two small disk units with a storage capacity of 160,000 characters are added, and a printing unit, the cost rises to a little over £2,000.

Only the dedicated expert should try to create computing power for under £200 but it is perfectly feasible to obtain quite substantial power for this figure. The processor and the immediate access store are the cheap components, but permanent storage for tens or hundreds of thousands of characters, and good input and output or high level computer language facilities will create significant expense.

The new technology

It may be of interest to look at some of the factors which have led to the production of these very cheap microcomputers. When computers were first used in the 1950s the mechanism which controlled the flow of electrical signals was the electronic valve. This was complicated to manufacture and relied on a heated wire element. This required significant power supplies and created considerable heat which had to be removed in some way. When it was found that a wire in contact with a semi-conductor crystal could control the flow of electricity between two adjacent wires, a new method of controlling electrical signals emerged which did not depend on high voltages and hot wires. This was the transistor.

The low voltage and heat production allowed the packing of the switching mechanisms very close together. Also the device depended only on the juxtaposition of conductors and semiconductor materials which could be achieved quite simply by laying down suitable patterns of stripes of different materials. Thus the low heat dissipation allows close packing and photographic methods allow very fine detail to be created. This led to the integrated circuit, the large-scale integration, and now very large-scale integration in which 32,000 storage bits can be packed into a square one-quarter of an inch long. These can be produced in thousands by completely automatic means and, although many of them are faulty, the volume of production means that processors and storage units now cost virtually nothing to produce. It should be noted that most statements on computer technology are now out of date before they are even printed. Storage units of 64,000 bits are already coming into use and a size of 512,000 bits will be available very shortly. A 'bit' is the fundamental computer storage unit which counts two values only. Thus eight of them, a byte, will store 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 values, or 256 different possibilities.

We now have the intriguing situation where processing power and immediate access storage of moderate size is very cheap, but the ancillary equipment is much more expensive particularly when mechanical equipment is involved. For example, if a computer was built personally, a substantial part of the cost would be for the input device particularly if a typewriter style keyboard was required. A home television set could be used for viewing the output from the program but if printed output is necessary then expenditure of £400–500 would be incurred, which is twice the cost of the computer. If a high volume of output is needed and a high-speed lineprinter must be purchased this will cost a few thousand pounds.

The other significant expense is associated with secondary storage. The instructions that control the computer are held in an immediate access primary store which also holds the information which is being processed at a particular time. But it is often necessary to store a large amount of information for eventual processing. Secondary storage is used for this purpose, usually in the form of a magnetic tape or a magnetic disk stack. This large volume storage in a permanent form which is not erased when the power is switched off, but it takes longer to reach a chosen piece of information on secondary storage.

The costs associated with secondary storage vary considerably, depending on the amount of information associated with a particular application. Recent developments have made it possible to store information on an ordinary domestic cassette tape recorder which can store 80,000 characters and can be incorporated for tens of pounds rather than thousands of pounds. For larger collections of information there are disk systems for 90,000 characters at £400, and the so-called floppy disk systems for 500,000 characters at around £1,200. Huge collections of information can also be stored on the traditional type of disk systems connected to small computers with a price of perhaps £12,000 for 12,000,000 characters of information. For applications which need large amounts of permanent storage there are still substantial costs involved, but the advent of the microcomputer has reduced the basic cost for computing power by a factor of ten which brings it within reach of many people with suitable uses for it.

The other factor which affects the user of a computer is the degree to which the system caters for the non-expert user. The £200 microcomputer which was mentioned previously must be given instructions as a sequence of numeric codes which control the flow of information through the machine by switching the electrical signals from one place to another. This requires considerable knowledge of the structure of the computer, it is a very tedious method of writing programs, and it is easy to make errors and difficult to identify them when they have been made. As we move up the scale of size and cost, a number of facilities are provided in the form of pre-written computer programs which reside in the computer. These can be of two types, compilers and operating systems. A compiler allows a user to specify his computing requirements in a language which is reasonably close to the way a problem might naturally be expressed by the user. An operating system is designed to organize the different activities inside the computer without the user specifying every step and making personal decisions about the sequence of operations or their priority.

Both of these facilities can take up a substantial amount of computer storage. Thus, careful analysis of the computing requirements must be made to ascertain the level of demand for permanent storage, and for user assistance in the form of compilers or operating systems. Storage requirements of more than half a million characters, or the use of a way of communicating with the user which has been extensively simplified, or the necessity for performing or controlling many tasks simultaneously will all suggest the use of a minicomputer costing tens of thousands of pounds. However, the microcomputer costing £2,000 can cater for a few hundred thousand characters of permanent storage and can provide a language for the user to specify his requirements which has good facilities and is acceptable to non-experts. Suitable applications of this type of computer to information retrieval and some library activities are described in the next two sections.

The use of a microcomputer for on-line information retrieval

In the UK the cost of using the international on-line information systems, such as the Lockheed Dialog system or the SDC Orbit system, is approaching £1 per minute if communication charges and long-distance 'phone charges are taken into account. A proportion of these charges could be avoided if a more sophisticated terminal was available and certain useful additional facilities could be provided with a more intelligent terminal.

Typically an on-line search contains a search definition phase when a number of terms are entered and combined, and an analysis and output phase where the collections most suitable for printing are selected and output generated either at the terminal or remotely at the site of the system operator. These remote prints are then sent by post to the requester.

There are a number of ways in which the searching costs can be reduced or the effectiveness of the searching increased. There are two activities which waste a significant amount of time and therefore increase costs unnecessarily: the slow typing speed of many operators at the search definition phase, and the difficulty of making policy decisions at the terminal prior to specifying the print-out required. The latter problem can be minimized by planning suitable strategies for narrowing or broadening a search before going to the terminal, and disconnecting from the search service if one's expectations are seriously disturbed as the search progresses. The search which has been built up will remain in the system for a reasonable period while a searcher rethinks his strategy or discusses it with the person who requested the search. When connection with the system is re-established the search definition continues from the position when disconnection took place.

In the search definition phase the operator would ideally like to type in the entry details, such as user name and password, and the search terms and their combination, before connecting to the system and incurring the heavy charge per minute. Technically it is quite feasible to use a microprocessor in conjunction with a standard terminal to preprocess a search before connecting to the on-line system. The search is built up in the store of the microprocessor and then reviewed and edited until spelling mistakes and logic errors are eliminated. When the operator is satisfied with his search definition, connection is established with the information system and the search is entered at the maximum speed of transmission. The analysis and refinement stage is carried out in the normal way by direct conversational interaction with the system unless it is decided to disconnect for further re-thinking as described above. It should be possible to reduce the cost of a search by perhaps 30 per cent. It is not likely that this will result in a decrease in the amount of searching, which would have a detrimental effect on the development of information services. Rather, a reduction in costs of this magnitude will substantially increase the number of people who could justify the cost of a search and thereby increase the overall amount of searching.

There are other features which could become available once the microcomputer was available. It might well be convenient to store temporarily the output from a search in order to manipulate this output in some way. Perhaps the user could be asked to scan the retrieval references, after disconnection from the system, in order to select only the relevant ones for printing. It would also be possible to annotate the output to indicate which journals are readily available and which will be difficult to obtain.

There are two ways in which this development could be implemented. A complete package microcomputer system with a communications link could be used to provide a self-contained on-line access system. Alternatively a purpose-built microprocessor could be interposed between an existing terminal and the communication system. Both of these possibilities are being investigated at UMIST to determine the potential and economics of these systems.

The potential of microcomputers in library and information systems

In this area it is essential to gain a clear idea of the power and limitations of the microcomputer since some aspects of library work seem eminently well served by these cheap computers whereas others demand more facilities. The aim should be to match the technology to the information need. The key factors which would militate against the use of microcomputers are the requirement of access to large volumes of stored data (above a few hundred thousand characters of information), or a regular need for significant input or output of data. However, if cheap microcomputers can be used they enable computing facilities to be made available to a much wider section of the community.

A number of information functions will be discussed here in quantitative terms to identify which applications could be candidates for microcomputers and which ones would generate difficulties. It would be impossible to give firm figures without a rigorous systems analysis to determine the precise requirements in a given system, but the difficult applications soon become clear. Consideration is given to borrower checking systems, short-term loan collections, long-term loan systems, maintaining and printing catalogues, book ordering systems and associated accounting, and circulating notices to the reader or borrower list. The sizes of the storage units are 90,000 characters for the mini-floppy disk system costing around £500 or 500,000 characters for a larger size of floppy disk which requires a unit costing about £1,200. These devices give the opportunity to access data from any part of the storage area quickly, the random access facility. Also available for £50 are cassette tape recorders which contain about 80,000 characters.

Before making calculations on possible storage capacities it is necessary to have some understanding of the way numbers are stored in the computer. The most rudimentary storage unit, the bit, can only store one of two possibilities. These bits are often grouped together in units of eight, known as a byte, which are of the right size to store a character. In fact, all the numerals, the upper and lower case characters, the punctuation marks, and a set of numbers used as computer signals can be accommodated in the collection of eight bits which form the byte. The eight bits each have two possible values giving $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256$ possible values. Most microcomputers of the moment are based on byte storage units although the most recent ones have sixteen bits or two bytes in a storage unit. It is usually inadequate to have only 256 possible values in information systems, so two units have to be treated together giving sixteen bits which have approximately 64,000 possible values, *i.e.* 256×256. Using two bytes together for storing numbers there can be 64,000 different borrower numbers, but more bytes will have to be linked together if there are more than 64,000 elements in any collection.

The number of items in a collection must be distinguished very clearly from the number of possible different items. For example, if all books have three decimal digits only as a classification code then there can be up to 1,000 different class codes but there could easily be only three hundred books in these 1,000 classification or perhaps several hundred thousand in a large collection. The calculation above shows that if we allocate a two-byte storage unit for each book-number we can have up to 64,000 different book numbers.

A borrower checking system

Using a two-byte unit is feasible for most borrower populations since most groups of borrowers would not number more than a few thousand. If the number of borrowers were further restricted to 4,000 then there is spare space in a two-byte unit to store extra information. This could, for example, be a code to show whether a borrower was at present an authorized user or if there were reserved books waiting for him. If simple borrower checks of this kind were required then a typical 90,000 character disk could hold information on 45,000 borrowers and this information would be accessible virtually instantaneously. If the larger size floppy disk were used this would be able to store 250,000 items of information. These figures should not be treated as rigid values since spaces must be let between items on the disk and the amount of space left empty depends upon the storage strategy. However, there is sufficient margin to indicate that this application could be mounted on a microprocessor in many establishments.

A short-term loan system

We have shown that a two-byte storage unit allows for up to 64,000 different numbers; this is a much higher figure than is required for both the borrower population and the short-term loan collection. Therefore, with four bytes of storage we can store both a borrower number and the number of the book they have on loan. It will almost certainly be possible to store a few other limited items of information by reducing the ranges below 64,000. On this basis the small floppy disk system can accommodate up to 22,000 transactions which is certainly adequate for a short-term loan system. Even if extra information is required, such as the due date for return, etc., which might need four more bytes of information and halve the number of transactions to 11,000 maximum, the figures still look entirely feasible.

A long-term loan system

In many full scale library circulation systems the scale of the task is probably moving beyond the level of the cheaper disk storage requirement. There may well be more than 64,000 loanable items so that each book number requires three bytes which gives a range up to sixteen million different items. Using this amount of storage for each item has the advantage that part of the storage can be used for checking purposes. Part of the number entered by an operator is related to the other digits so that incorrect entries will normally make the computer generate a different check digit and reject the entry. These checking systems allow identification of not only wrong numbers but also incorrect ordering and repetition of wrong digits.

Also a long-term loan system may need other information. Perhaps the full Dewey Decimal number should be stored together with the date of borrowing and date for return, or details of the borrower status or address. If the storage requirements for each transaction rose to sixteen bytes then the smaller disk units would limit the number of loans to a maximum of 5,000 which might not be adequate. However, with a dual floppy disk unit of the larger size the number of storable transactions rises to perhaps 30,000 which may be more reasonable. The costs of the larger unit are of course in terms of thousands of pounds rather than hundreds.

A library catalogue system

The full loan system is reaching the limits of what is feasible on a very small computer. The cataloguing system is not practicable for any but very small collections. A typical cataloguing record would certainly have 300 characters or so, and even with a large dual floppy disk system it would only be possible to store a maximum of 1,500 records of this size. There will also be a requirement for good quality, high volume output so that an expensive printer is probably needed. For this application a minicomputer or access to a large mainframe is a more appropriate choice.

A borrower mailing system

If there is a regular requirement for mailing to selected groups of borrowers or to the whole group then a different type of problem arises. This is a job where there is no requirement for rapid access. It would be feasible to start the printing of a set of address labels and allow this to continue over the course of a few hours. It would be quite feasible to carry out this task by having a number of floppy disks each storing a section of the borrower population and feeding these into the system consecutively. The main difficulty would not be the storage but the time it would take for a slow printing device to print the material. One thousand names and addresses could probably be printed in two or three hours, but if there were five thousand, a ten to fifteen hour task might be unacceptable. But if this gave an opportunity to automate this task for a low investment, even very long times might be acceptable.

An order processing system

In this type of system transactions will have a few hundred characters of information but in contrast to the cataloguing situation the number of transactions will be much smaller, probably no more than a few hundred, so that storage on a small floppy disk seems feasible. Using a computer for this application is most attractive since automatic lists of accounts to be paid, replies not received, books to be re-ordered when back in print, etc., can be produced.

One most often wishes to access the order processing system to amend the stored information, or to print selected lists so that the input and output is not normally of a high volume. This type of application could be suitable for a small computer in many environments.

Conclusion

There is no doubt that powerful computers are now available for ten times less than the prices in 1977. These microcomputers have a high level of computer language so that non-experts find them easy to use. If the present rather limited facilities are suitable for a chosen application then computing power is now available at a price within the budget of many small units.

It is essential that the character of the application is carefully analysed to identify any factors which will render the use of a microcomputer inadvisable. If a high volume of output is required necessitating the use of a fast line-printer then the cost moves into the thousands of pounds. If more than a million characters of stored information must be available simultaneously then a larger, more highly priced disk store will be necessary. The amount of storage will be one of the key factors determining the price of the equipment required.

Another factor to be considered is the complexity of the tasks undertaken. If the process is a single activity such as taking pieces of stored text in turn and printing them on a sticky label, then very little space and time is taken to run the computer program. If the computer must control a number of simultaneous tasks such as when different people enter new accessions, check borrower status, enter loan details, cancel returned loans, etc., then there will be a complex controlling program taking considerable time and space; such an operating situation may not be feasible for a very small computer. If a very fast speed of reaction from the computer is necessary, a microcomputer may not be able to achieve sufficient processing in the time available.

It must also be remembered that at the end of 1978 many of the useful developments were still pending. The most obvious microcomputers for unskilled users had some small storage units of eight bits only, whereas sixteen-bit components were available but not yet in a simply presented package. The facility to use standard communications equipment such as modems or acoustic couplers was only just appearing. Although the cheaper, smaller disk units were in use, the development work was still underway on the quarter-million character disk unit on the packaged microcomputers.

The other factor arguing against the use of the new equipment is the early stage of development of the programs to go with the equipment. In many cases a program may have to be written for a particular application and the costs of developing the program, which must be added to the cost of the equipment, will probably exceed it.

The best advice must be to match the technology to the information need, to analyse carefully the system which is to be computerized, and to seek expert guidance at the planning stage.

BRIEF REVIEWS

CHRYSSOSTOMIDIS, M. Offshore petroleum engineering: a bibliographic guide to publications and information sources. London, Kogan Page, 1978. 367 pp. £18.05. (ISBN 0 89397 045 X.)

This guide consists of a bibliography giving details of some 2,600 books, conferences and reports on off-shore petroleum engineering and related topics. Publications listed in the bibliography were published up to November 1977 and are mainly American although many British, Canadian, some French and some Norwegian items are listed. The bibliography is arranged by broad subject area, most subject sections being further subdivided into more specific subject areas. Each subsection is divided according to type of publication. Note that patents are excluded and that only a few theses are listed. Suggestions on how to identify both these types of literature are given although we were surprised to note that the discussion on British theses mentioned the *BLLD Announcement Bulletin* only and ignored the *Aslib Index to Theses*. Many of the entries in the bibliography include an abstract. Journal articles and conference papers are not indexed separately although the complete contents of conferences are provided. A praiseworthy point is that full information is given on how to obtain the publications and full addresses are given for publishers. Suggestions are given for sources suitable for current awareness and the indexes include a permuted topic index, an author index and a title index. The guide would be of value to anyone setting up a library in this subject area and would assist existing libraries in supplementing their collections.

International bibliography of directories. 6th ed. Munich, Verlag Dokumentation Saur, 1978. £32.50. (ISBN 3 7940 1256 9.)

The bibliography has been completely revised since the last edition in 1973 and about 1,000 more entries have been added bringing the total to over 7,000. The arrangement has also changed. There are now only four main subject headings: (1) General, (2) Science, Technology, Art and Culture, (3) State and Society, (4) Business and Economy, but many subheadings break down the bibliography into searchable sections. Within each sub-section the arrangement is first geographical—according to the areas the directories cover—and then alphabetic. This is an improvement on the fifth edition in which titles were listed alphabetically throughout each sub-section. The countries and areas are by order of their German names but the geographic index at the end of the directory is by English names. The preface, contents list and subject headings are in both languages, however. Another major change is the absence of a subject index; the reason given is that exact translations of subjects are not always possible. It is quite easy to trace the required sub-sections without a subject index but it may then be rather daunting to meet directory titles in their various original languages. Translated titles or annotations in English and German would, we suspect, make this very useful guide even more popular.

There are annotations in many cases to indicate size of coverage (*e.g.* 560 manufacturers).

Full addresses for publishers are given in a separate list and there is a key to explain the abbreviations and one which relates currencies to their countries. There are four pages of addenda.

The bibliography appears to be well up to date. Most of the directories are dated 1976 or 1977 or are regular publications, although titles published from 1970 were included. Because of its wide and current coverage the bibliography must rank as one of the best of this type of guide.

LEWANSKI, R. C. Subject collections in European libraries. 2nd ed. London, Bowker, 1978. 495 pp. £32.50. (ISBN 0 85935 011 8.)

The second edition of *Subject Collections in European Libraries* has now appeared approximately twelve years after its predecessor. The system of classification is Dewey, in this case the eighteenth edition, and the weakness of Dewey for use in classification of library collections is once again evident.

There is no index of institutions covered by the directory, and this omission is only partly compensated for by the few multiple entries. For a directory with European coverage, it is surprising to find one subject index in English, covering only the headings used in the text. A useful prefix to the subject index would be reference to Dewey, eighteenth edition, especially for non-English speaking users. Within the main text, the subject entries are further arranged alphabetically by country, town and then by name of institution; this arrangement would be more convenient had the names of the towns been printed in heavy type also.

The amount of information given in each entry, although increased, still varies. It does include a list of publications by and about the institution concerned, but this bibliographic information is not always complete. Telex or telephone numbers or both would be useful additional categories of information in future editions. As a result of a brief study of this publication, a number of omissions were noted, *e.g.* British Institute of Management does not appear under 658: Management. It would be interesting to know on what basis the collections had been selected for inclusion.

Despite the above criticisms, the guide, covering a wide range of countries and institutions and being the only international directory of its type, will be a useful tool providing it is used with care.

ROBERTS, V. L. Product standards index. 2nd ed. New York, Pergamon, 1977. 516 pp. £16.50. (ISBN 0 08 022123 8.)

Identifying standards organizations from their codes or tracing details of standards for a given product can be very time consuming tasks and *Product Standards Index* should serve as a welcome short cut in many cases.

The index does not claim to be comprehensive but aims to cover consumer products (in a wide sense), excluding material specifications and dimensional tolerance standards that do not directly concern safe product design and operation. 144 standard issuing bodies are included, 122 in the USA and twenty-two national or international organizations in other countries. To give an idea of the coverage, there are 150 standards listed from the British Standards Institution. At the front of the book the 144 organizations are listed by abbreviation with the full names and addresses. Forty-two other non-USA standards bodies (not covered by the index) are then listed with addresses.

The first main part of the book lists standards by subject and is divided into the following sections: Consumer products p. 15–38, Automotive and Vehicular Equipment p. 39–86, Industrial Equipment and Materials p. 87–124, Construction Equipment and Materials p. 125–36, Commercial/Business Equipment p. 137–42, Medical and Health Care Products p. 143–58, Agricultural Equipment p. 159–67. Some of these sections are further subdivided by subject and the product standards codes are given, with dates in many cases. There are some cross-references but care should be taken to check under alternative names if the required product heading is not immediately traced. Introductory notes to each section are helpful and there is a topical index at the back of the book which lists all the product headings used alphabetically with page references and is intended as an entry point to the subject sections.

The second part of the book lists standards codes and titles by the issuing organization. An organization (by abbreviation)–page index follows which may be used as a key to the second part of the book.

Product Standards Index is not a substitute for the national lists of standards but should be a very useful additional source and quick guide.

Letter to the Editor

BLAISE/UNIVERSITY OF LONDON

I have read Brian Collinge's article on BLAISE in the October/November 1978 issue of *Aslib Proceedings* and welcome the allusions (p. 399) to the use of BLAISE under a union catalogue function and to the University of London's proposed use of BLAISE as a union catalogue.

In order not to give a misleading impression that this use is straightforward at least in the University of London's view, reference should be made to the fact that the libraries concerned would *prefer* to derive a physical union catalogue via BLAISE–LOCAS as SCOLCAP libraries for instance are expecting to do. The University of London reluctantly decided that a COM union catalogue would be expensive to produce given the present limitations of LOCAS and the British Library have guaranteed its production at the termination of the British Library/London University contract. Furthermore, the University considers the use of BLAISE in the way described to be as a '*prospective* union catalogue' and the expense of such use has hardly been estimated so that it needs to be carefully monitored. It must be remembered that cataloguing on-line itself is very expensive (compared to input via LOCAS) so that the virtue of such a union catalogue will be hard to justify.

Hence, I might add that a recent Research Proposal was discussed by the University and the BLR&DD, and considered to be unacceptable; this, while directed at other aspects of editing a 'prospective union catalogue' compiled through BLAISE, was also very much concerned with the use of BLAISE in the way Mr Collinge describes.

I feel that the prospect is not as clearcut as the article seems to suggest.

S. W. MASSIL
Library Resources Co-ordinating Committee
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the symmetry of shelves, and creators of odd volumes."
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MAY 1979
VOL. 31, NO. 5

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J. L. Hall

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Prestel and public libraries: an LA/Aslib experiment

John Martyn
Research Consultant, Aslib

Paper presented at an Aslib Evening Meeting, 17 January 1979

FROM TIME TO TIME in the information and library world, something comes along in the way of a new idea or a new piece of technology which we feel is likely to have a significant effect on the way we do things in our professional lives. During the last fifteen years or so, the new developments have included post-coordinate indexing systems, electrostatic copiers, the use of computers in batch mode, citation indexing, computer typesetting, on-line search of remotely-stored data bases, the growth of networks, The National Lending Library at Boston Spa, routine use of microforms, the British Library, and so on. There are usually a few new things either just on the scene or lurking below the horizon, like microprocessors, word processing equipment, Public Lending Right, possible new copyright legislation, the European Patents Office and possibly Euronet, which cause us to worry, perhaps, or to want to find out more about them. Finding out about any of these things, though, hasn't been too much of a problem, because we have been able to do a conventional literature search through the scholarly and professional journals, or through Government publications, and get by these means a pretty good idea of what has been going on. What I am going to talk about tonight though, Prestel, isn't really like that at all. For one thing, most of the publication about it has been in the popular press, in the shape of new announcements and press releases, with very little in the conventional journals (apart from one or two papers in the electronics and electrical press). For another thing, it seems to have come upon us relatively rapidly, even though, paradoxically, its promised public advent has been beset by a variety of delays. Then too, whereas other technological advances have appeared in different areas of human activity and have gradually infiltrated into the information and library world, here we have a radically new type of information supplying service which suddenly appears more or less full-grown in our world from a possibly unexpected quarter. And, of course, the creature changed its name from Viewdata to Prestel not very long ago, which has not greatly helped our confusion.

What I want to do is to explain what Prestel is and does, and how you work it, with an example or two, then describe how Aslib and the Library Association are involved in some experimental work with it, talk about some of the problems we have been encountering along the way, and finally say something about the possible future implications of this sort of system for libraries.

Aslib Proceedings, 31 (5), May 1979, p. 216–236. Printed in Great Britain

Prestel defined

There are at present two types of system which display textual information to users on the screen of a television receiver. The systems are called teletext and viewdata; there are two teletext services, Ceefax and Oracle, supplied by the British Broadcasting Corporation and the Independent Television Authority respectively, and one viewdata service, called Prestel, supplied through the Post Office.

The basic difference between the two systems is that teletext is broadcast with the television picture signal, filling the space assigned to some of the lines which build up the picture on your screen but which do not appear in the picture you see, whereas the viewdata signal is carried over the normal telephone lines. Both systems use colour television sets, but monochrome sets can in principle also be used. Sets are now available in the shops which will receive teletext only, and sets are now becoming available, initially through the rental companies, which will receive both teletext and viewdata. It is possible to buy plug-in modules—they plug in the aerial socket—which will convert ordinary colour TV receivers to teletext receivers, at a cost usually around £200, and it seems likely that at some future date, similar devices will be available to convert to viewdata receivers too, although none are commercially available yet.

To use Ceefax, a viewer presses a button or a switch, usually on a handheld keyboard quite similar to those now supplied for remote operation of a normal TV set. This switches out his normal picture and presents him with a contents page or pages, each page title bearing a number. The viewer then presses the number of the page he wants to see on his keypad. As the pages are transmitted one after the other, at a rate of four a second, his decoder then picks out the selected page when it is transmitted, and holds it on the screen for as long as required. Ceefax is deliberately limited to 100 pages on each channel (BBC1 and BBC2) at the moment, which means that the average waiting time for a selected page to be presented is 12½ seconds; because of the way it transmits the pages one after the other, much more than 100 pages in the system would mean unacceptably long delays in accessing a particular page. The sorts of information carried are basically current awareness, news items, covering several pages of world news, financial news, sport, current food prices, weather news, radio and TV programmes, jokes and puzzles and so on; there is also a newsflash facility, which allows one to watch a television programme, and when a newsflash is issued it will appear over the picture. BBC journalists continually update the pages, so that the information content is continually up to date. At present, Ceefax and Oracle are free services, in as much as the user pays nothing for their use other than the initial outlay on buying the decoder, either already installed in his new set or to plug in the back of his existing one.

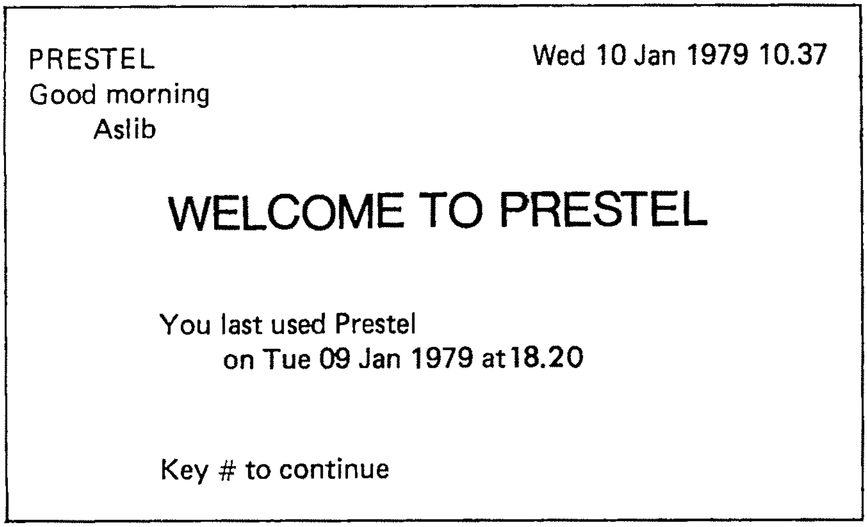
Viewdata systems, or at least the only one we know about, Prestel, are quite different. Because they are accessed over the telephone lines, the first operation in using the system has to be establishing the telephone connection, which at present is done by dialling a number (or on the latest receiver, by pressing a button) and, on receipt of the appropriate tone, putting the signal into the TV set via a modem. That is to say, access to the system is slightly more complicated. Prestel has to be paid for by the user whereas teletext is free at present (although it's possible that users may have to pay in some way, perhaps by an increase in licence fee, in the future). Teletext offers a small number of pages of information, whereas Prestel is potentially virtually unlimited.

Probably the most important difference is that Ceefax is a service wholly compiled, controlled and distributed by the BBC, in that the Corporation decides what information shall be put into the service, compiles it, maintains it and can change it whenever it wishes (and correspondingly for Oracle). In the case of Prestel, the Post Office operates the system, in the sense of providing and operating the computers, maintaining the telephone network, and doing the accounting, including revenue collection, but apart from some information which it puts up on its own account, telling users about the system and so on, it does not commission or generate or update any of the information content itself, but instead, rather like the advertising manager of a newspaper, it sells space to Information Providers, who are then free to put up whatever they like, providing it's not actually obscene. In effect, the BBC has a moral responsibility directly to its users, but the Post Office responsibility is to the Information Providers.

Before I describe Prestel, which I shall do by taking you through a sample search, I should give you a definition or two. The Post Office is the service supplier, and its role is defined as that of 'common carrier', which means that it has the technical responsibility for making the service available. It owns the system software (because it developed it), but in principle there would be nothing to stop another organization either buying or leasing its software, or developing its own, and offering it in competition with Prestel over the telephone lines. The Post Office sells space in the service to Information Providers, who can be individuals, commercial organizations, public bodies or anyone else with the money, and the Information Provider is then able to put in information up to the capacity that he has leased. Space is sold in terms of 'frames', and a frame is one screenful, which at maximum is forty characters wide and twenty-four lines deep; a 'page' of information is a chunk of information on the same topic which can be too long to get onto one frame, so that it occupies several frames linked together by alphabetical suffixes on frame numbers, and accessible sequentially. Payment by Information Providers is made in terms of number of frames input, and payment by users is made in terms of numbers of frames called up.

Prestel isn't like an on-line bibliographic database system, because the individual items of information aren't separately indexed like the references in a bibliographic file, so you can't call up a particular base, then key in search terms, either singly or in Boolean combination, and get to a particular item that way. In any case, the keypad used to interrogate the system doesn't have alphabetic characters. It has, in addition to the usual channel-switching and adjusting controls, the numbers from nought to nine, an asterisk and a hashmark. There are effectively three ways to get to a particular piece of information. The easiest and cheapest is to call the number of the page you want directly, which means of course that you have to know what the page number is.

This will probably be quite a common method of search, because if, for instance, you often travel from London to Birmingham, you would note the



PRESTEL Wed 10 Jan 1979 10.37
Good morning
Aslib

WELCOME TO PRESTEL

You last used Prestel
on Tue 09 Jan 1979 at 18.20

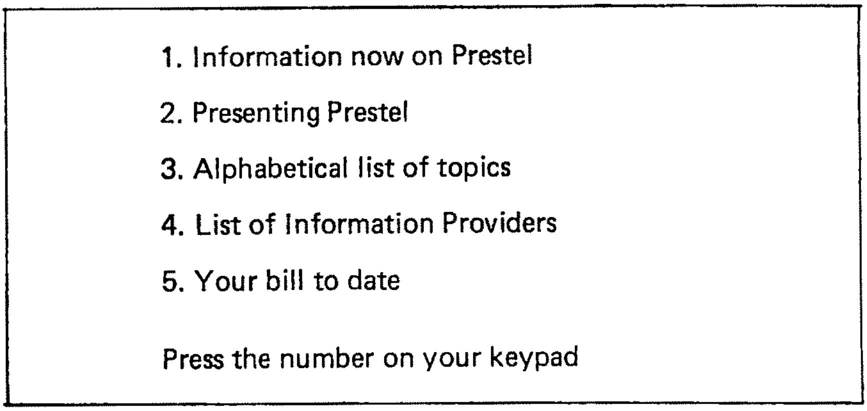
Key # to continue

FIG 1

number of the page that carries that particular timetable, and go directly to it rather than spend time and money going through the structure. Another way is to enter by using the Information Provider's name; if you know that a certain Information Provider has your piece of information up, but you can't think what it was classified under, this is how you'd get to it. The third way is by using the rather broad subject headings which the system supplies. This is what we'll look at now.

How Prestel works

Supposing I want to find out the exchange rate of the French franc, I can't find the newspaper which would have it, and it's raining too hard for me to walk down and look at the board in the bank window. I decide to use Prestel, so I make contact with the system. Figure 1 shows the first page I see. These are not exact copies of Prestel pages, of course; I've drawn them and left out some unimportant bits of text here and there. Anyway, I want to continue, so I press the hashmark on my keyboard and I get the information depicted in Figure 2. Being an index-oriented person, I choose to look at the alphabetical list of topics (shown in Figure 3). I guess that what I want will be under 'Exchange Rates', so again I hit three and get the information shown in Figure 4, and move from there to Figure 5, where I am gratified to see that I guessed right, that in fact exchange rates are available in the system (which I didn't know before), and that they're not under 'Rates of Exchange' or 'Currency' (although in fact they might be; I haven't looked). So now I press asterisk one six six hash, and this takes me to Figure 6. Nine looks like the right choice, and indeed it is (Figure 7). I now wonder what the difference is between exchange rates and today's exchange rates, but the latter sounds more current, so I press three, and

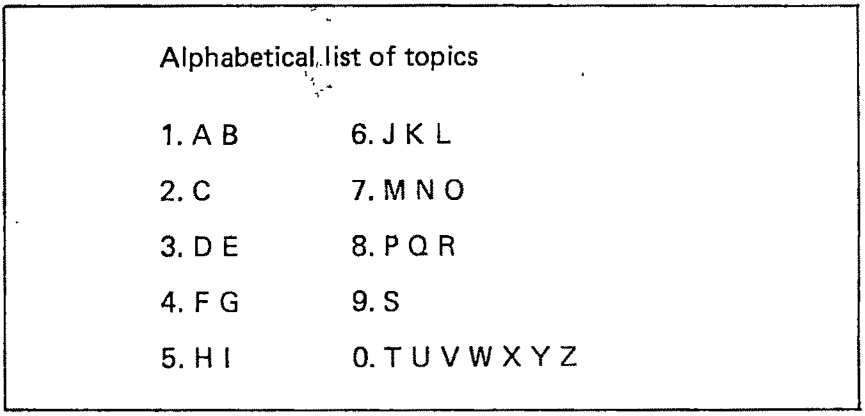


1. Information now on Prestel
2. Presenting Prestel
3. Alphabetical list of topics
4. List of Information Providers
5. Your bill to date

Press the number on your keypad

FIG 2

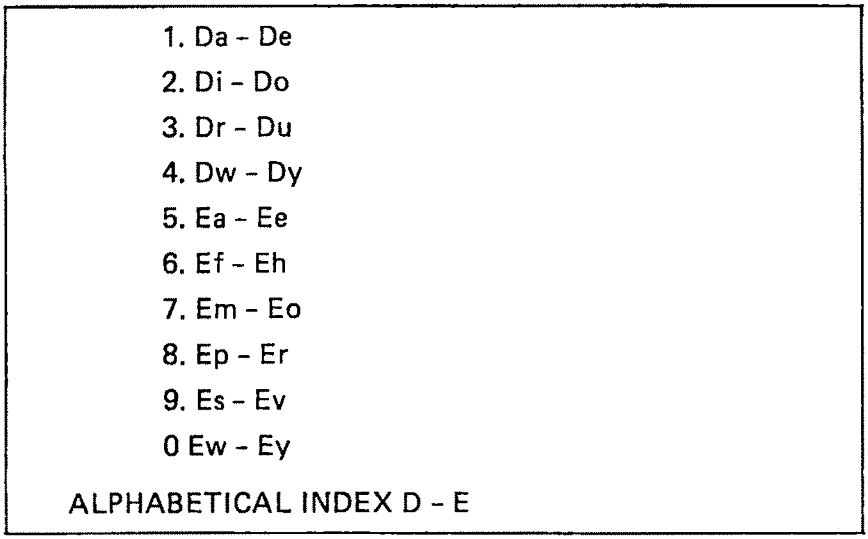
get the information shown in Figure 8, which as you can see is just what I wanted. Now you'll notice the number 520054 in the top right corner. If I'd known that number before, I could have pressed asterisk 520054 hash as soon as I entered the system and got directly to this page, which would not only have been quicker, but would have saved me half a penny for each of the index pages I used on the way. Note, by the way, that this page carries a price of two pence, shown after the page number. The charge for pages is always shown on the preceding page, so that although I didn't write it on Figure 7, in fact after FINTEL there was a note '2p to 10p', and after STOCK EXCHANGE was written '2p'. This means you know how much your information is going to cost you before you buy it, although I feel that after you've fought your way through the indexing to get it, you're pretty well committed. If I'd chosen FINTEL instead of STOCK EXCHANGE, I would have received the information shown in Figure 9 and then after pressing nought the information in Figure 10. You'll notice that the two services give different sorts of information. The Stock Exchange gives you some rates against the dollar, but Fintel gives you



Alphabetical list of topics

1. A B
2. C
3. D E
4. F G
5. H I
6. J K L
7. M N O
8. P Q R
9. S
0. T U V W X Y Z

FIG 3



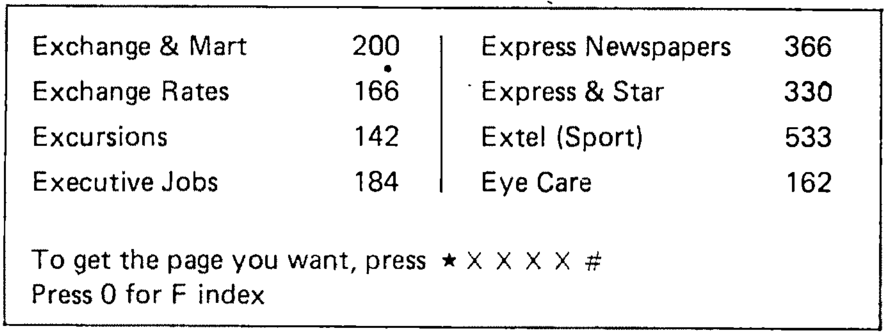
1. Da - De
2. Di - Do
3. Dr - Du
4. Dw - Dy
5. Ea - Ee
6. Ef - Eh
7. Em - Eo
8. Ep - Er
9. Es - Ev
0 Ew - Ey

ALPHABETICAL INDEX D - E

FIG 4

the spread and includes some currencies, *lire*, *yen*, *kroner* and *guilders*, which the Stock Exchange doesn't. Comparing one against the other, the values shown agree with each other, except in the case of the Swiss *franc*, which the Stock Exchange shows as 3.3320, and Fintel as 3.3550 to 3.3650. This is probably an unimportant difference, and probably has something to do with the time of day the information was put up. The point to notice is that the indexing only leads you to pages containing exchange rates, not to specific rates, so if you wanted the *lire* rate, for example, you'd have no way of selecting the page containing that information without looking at both. If you wanted the *peseta* rate, hard luck.

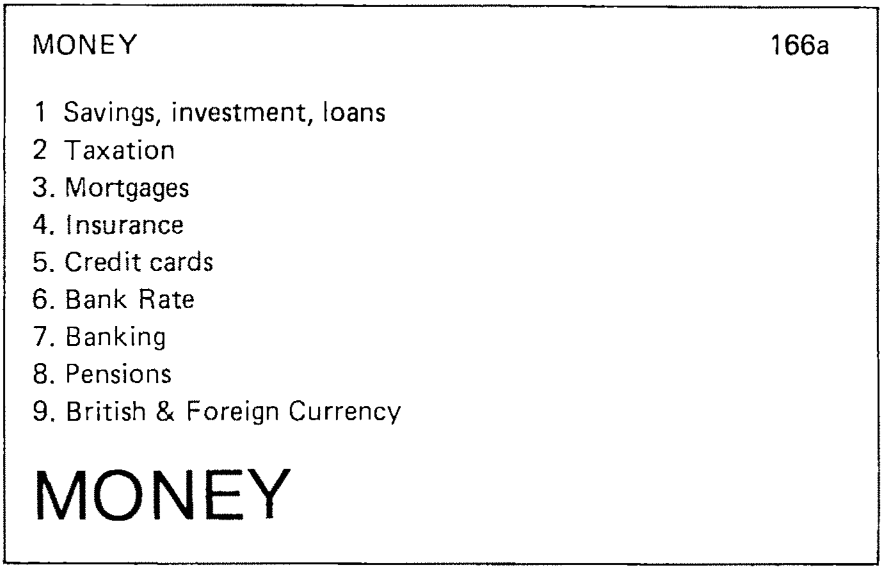
Actually, there is an alternative route to this information. If, instead of opting for the alphabetical list of topics when I began, I had selected 'Information now on Prestel', I'd have got the page depicted in Figure 11. I think it's fairly obvious to most people that exchange rates are most likely to be found under



Exchange & Mart	200	Express Newspapers	366
Exchange Rates	166	Express & Star	330
Excursions	142	Extel (Sport)	533
Executive Jobs	184	Eye Care	162

To get the page you want, press ★ X X X X #
Press 0 for F index

FIG 5



MONEY 166a

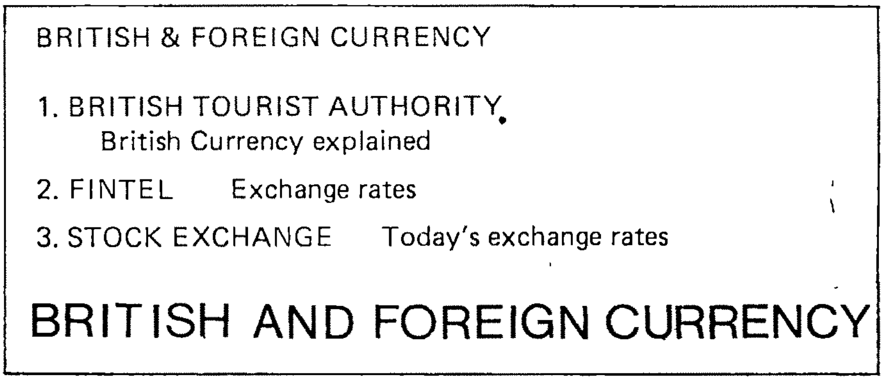
1 Savings, investment, loans
2 Taxation
3. Mortgages
4. Insurance
5. Credit cards
6. Bank Rate
7. Banking
8. Pensions
9. British & Foreign Currency

MONEY

FIG 6

Business, so if you press one you get Figure 12. By the look of it, exchange rates seem most likely under 'FINTEL, news, companies, statistics', and you don't get any indication that the Stock Exchange covers anything other than share prices. So you call for the FINTEL page, and get Figure 13, hopefully opt for statistics again and get Figure 14. Taking one, obviously, then gets you to Figure 9 and so to Figure 10.

This turns out to be a quicker way to the information, because I've only called six pages, as against eight by using the alphabetical topic list; however, doing it the quicker way led me to the tenpenny page, whereas the longer way gave me the chance of getting the twopenny page first. The fact that you would



BRITISH & FOREIGN CURRENCY

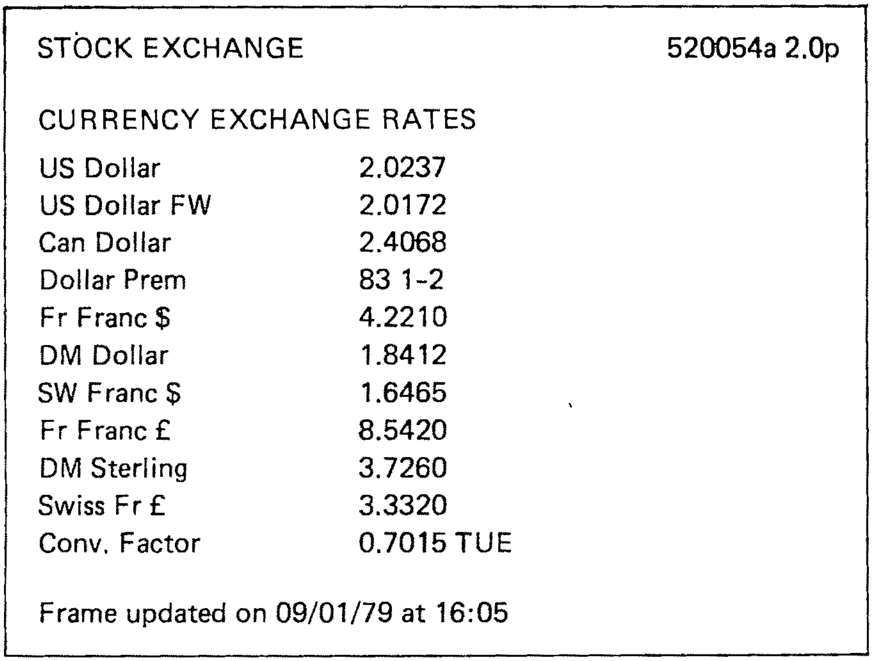
1. BRITISH TOURIST AUTHORITY.
   British Currency explained

2. FINTEL Exchange rates

3. STOCK EXCHANGE Today's exchange rates

BRITISH AND FOREIGN CURRENCY

FIG 7



STOCK EXCHANGE 520054a 2.0p

CURRENCY EXCHANGE RATES

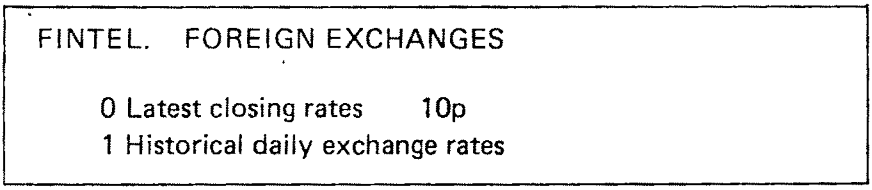
US Dollar	2.0237
US Dollar FW	2.0172
Can Dollar	2.4068
Dollar Prem	83 1-2
Fr Franc $	4.2210
DM Dollar	1.8412
SW Franc $	1.6465
Fr Franc £	8.5420
DM Sterling	3.7260
Swiss Fr £	3.3320
Conv. Factor	0.7015 TUE

Frame updated on 09/01/79 at 16:05

FIG 8

not get to the Stock Exchange page by using the 'Information now on' route is, incidentally, the fault of the Stock Exchange, because they didn't put exchange rates in their annotation, not of the Post Office.

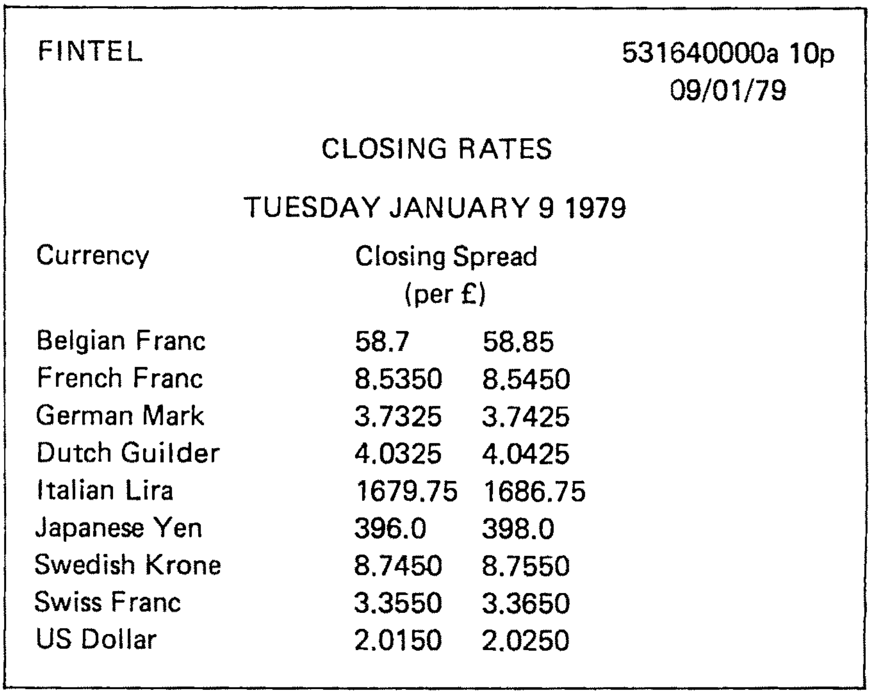
You have seen something now of the indexing structure and philosophy. Clearly it's much more cumbrous and unsophisticated than is found in bibliographic on-line services. There is nothing in principle to prevent each page of information being indexed with suitable descriptors, and searches then being performed with Boolean operators, but this would require not only the production of additional system software and provision of alphanumeric keyboards at the user end but also correct, consistent and compatible indexing by information suppliers. My own feeling is that the provision of this degree of sophistication is probably more than the market wants. The present system, although inelegant from our point of view, is nevertheless very easy to use by members



FINTEL. FOREIGN EXCHANGES

0 Latest closing rates 10p
1 Historical daily exchange rates

FIG 9



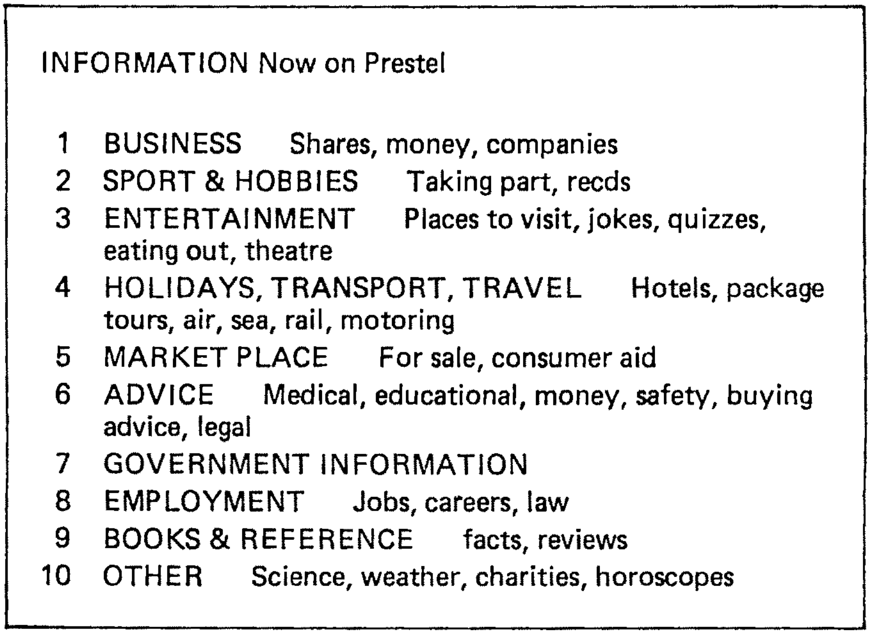
FINTEL 531640000a 10p
09/01/79

CLOSING RATES

TUESDAY JANUARY 9 1979

Currency	Closing Spread (per £)	
Belgian Franc	58.7	58.85
French Franc	8.5350	8.5450
German Mark	3.7325	3.7425
Dutch Guilder	4.0325	4.0425
Italian Lira	1679.75	1686.75
Japanese Yen	396.0	398.0
Swedish Krone	8.7450	8.7550
Swiss Franc	3.3550	3.3650
US Dollar	2.0150	2.0250

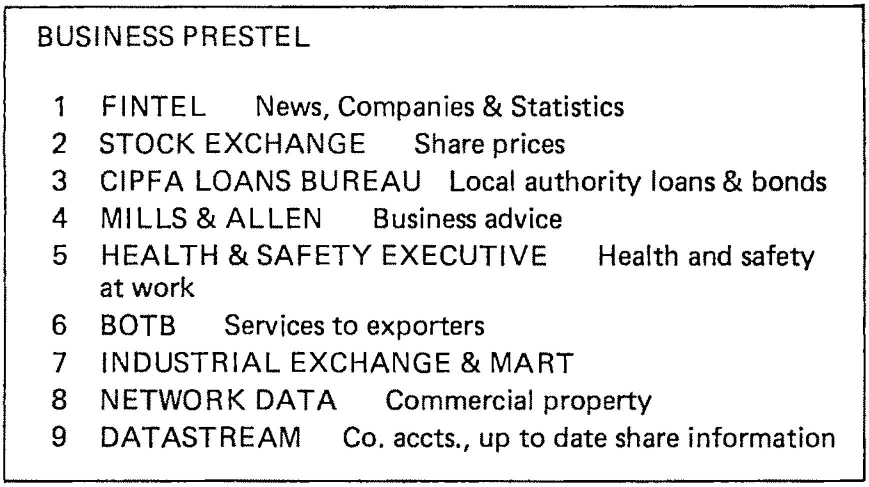
FIG 10



INFORMATION Now on Prestel

1 BUSINESS Shares, money, companies
2 SPORT & HOBBIES Taking part, recds
3 ENTERTAINMENT Places to visit, jokes, quizzes, eating out, theatre
4 HOLIDAYS, TRANSPORT, TRAVEL Hotels, package tours, air, sea, rail, motoring
5 MARKET PLACE For sale, consumer aid
6 ADVICE Medical, educational, money, safety, buying advice, legal
7 GOVERNMENT INFORMATION
8 EMPLOYMENT Jobs, careers, law
9 BOOKS & REFERENCE facts, reviews
10 OTHER Science, weather, charities, horoscopes

FIG 11



BUSINESS PRESTEL

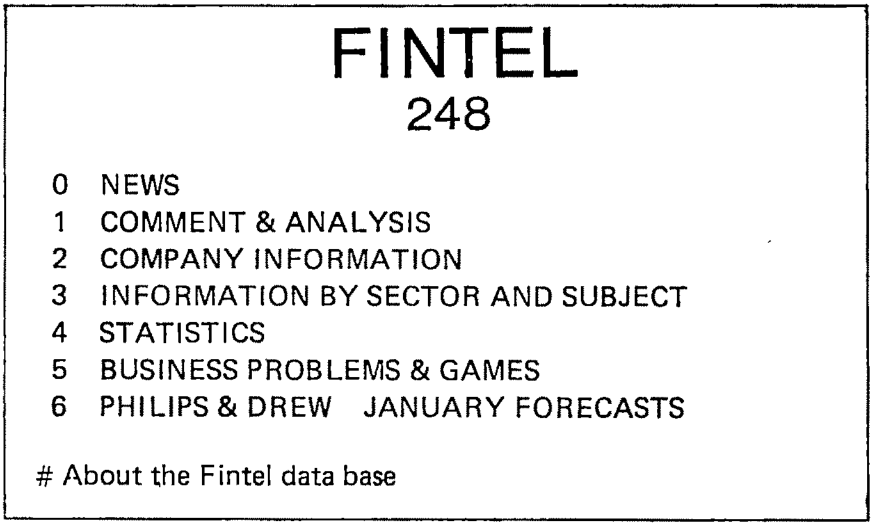
1 FINTEL News, Companies & Statistics
2 STOCK EXCHANGE Share prices
3 CIPFA LOANS BUREAU Local authority loans & bonds
4 MILLS & ALLEN Business advice
5 HEALTH & SAFETY EXECUTIVE Health and safety at work
6 BOTB Services to exporters
7 INDUSTRIAL EXCHANGE & MART
8 NETWORK DATA Commercial property
9 DATASTREAM Co. accts., up to date share information

FIG 12

of the general public, and I suspect that greater sophistication would be neither appreciated nor understood.

The experiment

When Prestel was first introduced, it was intended that there should be a test period beginning early in 1978, in some areas of London, Birmingham and the city of Norwich. This was to last for about eighteen months and to be followed



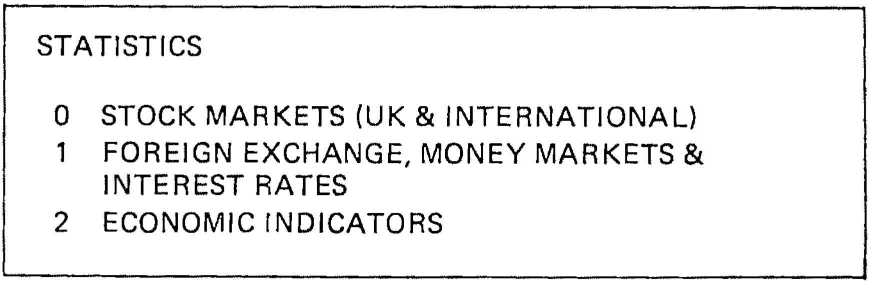
FINTEL

248

0 NEWS
1 COMMENT & ANALYSIS
2 COMPANY INFORMATION
3 INFORMATION BY SECTOR AND SUBJECT
4 STATISTICS
5 BUSINESS PROBLEMS & GAMES
6 PHILIPS & DREW JANUARY FORECASTS

# About the Fintel data base

FIG 13



STATISTICS

0 STOCK MARKETS (UK & INTERNATIONAL)
1 FOREIGN EXCHANGE, MONEY MARKETS & INTEREST RATES
2 ECONOMIC INDICATORS

FIG 14

by fullscale availability on a market basis. There were various revisions of the dates involved, and eventually the test service (once called the market trial) began in June 1978. In fact a pilot service had been operating before this date, and because of delays in the manufacture of terminals, and a number of other factors, when the official market trial began, virtually no information providers had their full file up, and very few user terminals were around. The public service date has been brought forward and will now overlap the test period. Before the market trials began, the British Library indicated that it was interested in Prestel in various ways, and in addition to planning for the input of material which it would generate itself, it invited Aslib's Research and Consultancy Division to design studies in two areas; the first was that of the effect of Prestel use on the reference services of public libraries, and the second that of the potential of Prestel as a vehicle for the dissemination of community information. As a result of this, two projects were set up, whose structure is as follows:

The reference project

Six public libraries in the London boroughs of Bexley, Hounslow, Sutton and Waltham Forest, and in Birmingham and Norwich have Prestel user terminals sited in their reference departments. After a short period for familiarization, the terminals will be available for public use, either directly by members of the public, or with supervision by a member of the library staff.

We expect that both modes of use will be tried. Before the terminals were installed, surveys of reference department use were carried out, and during the rest of the period we shall be monitoring the use of the terminals, and interviewing members of the libraries' staff, and members of the public who have come into contact with the system in the library. The object here is to assess what the effect of Prestel availability might be on the library: In terms of stock—does Prestel mean that a library can drop some things it currently purchases, or conversely, is there pressure to add to stock? Services provided—does Prestel mean that the need to provide some service is no longer felt? Traffic—are there more queries or less? Staff reactions and opinions will be sought, initially and towards the end of the project. The object is to find out how useful Prestel is likely to be in the library, what sort of demands and constraints it imposes, what sort of costs are involved, and how the librarian will come to terms with it.

The community information project

The same six libraries are collecting and sending in information relating to their local communities, and Aslib staff then format this for input, and put it into Prestel through an editing terminal. We can get some idea of its use from the computer monitoring records which the Post Office is maintaining on frame usage, and, although we cannot approach the users directly for their reactions because the Post Office is maintaining the anonymity of the domestic users in the test period (to stop them being bothered too much by us and all the other Information Providers), we will be able to add a small number of questions to the surveys which the Post Office will be conducting. We shall also get reactions from library staff and library users. What will come out of this project will be guidelines on how one does the inputting, which, if the information is to be easily found and easily absorbed, is by no means a simple job; guidelines on what sorts of community information seem to be in demand, and are suitable for carrying on Prestel; guidelines on the use of Prestel from an input-provision point of view, and possibly something on the cash and labour costs; and a lot of guidance and comment on the problems of creating and maintaining this sort of file. I'm not going to say much more about the reference study, but will talk quite a lot more about the community information study, partly because at this relatively early stage there is a lot more that can be said about this one, and partly because it is considerably more complex.

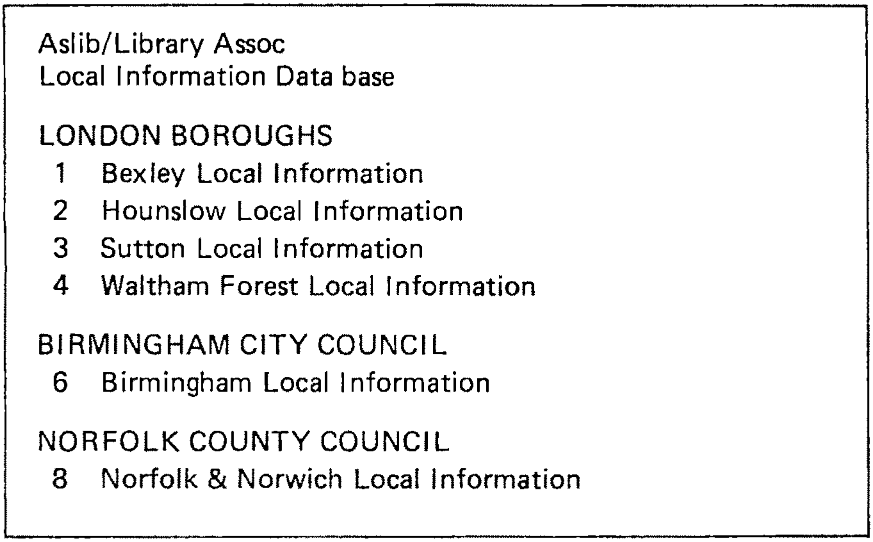
Before I get onto this, though, something about the administration of the project—one product of which is, I think, the world's first piece of stationery with a joint Aslib-LA letterhead. I'm very fond of this, because it's a practical demonstration of what I believe the library and information profession is all about, which is co-operation. Under the present arrangements, the British Library is providing the funding for the terminals in the participating libraries, which is in the order of £18 a month per terminal, installation costs, which covers a TV aerial, licence fee and perhaps placing of a jack-plug socket, and 85 per cent of the cost of Prestel usage. Libraries pay their own telephone charges. An Advisory Committee of the chief librarians involved, some other interested parties, Aslib Research and Consultancy staff and BL staff, meets regularly; the Library Association convenes this Committee and provides the secretariat, and acts as Project Head, which includes channelling the grant support to the individual libraries and keeping the necessary records. Aslib is separately funded for the research effort, and for the input activities which it carries out on the libraries' behalf; at present, for contractual purposes Aslib is the Information Provider. One of the inputters is shared with the British Library, working part-time on its own input. The Research Officer for Community Information Studies, located with the Library Association, acts as liaison between the LA and the Aslib staff.

We have 8,000 frames earmarked for community information during the trial period, free of storage charges. It may be a little early to generalize, but our experience so far suggests that it won't be very difficult to get enough information to fill them. So far we have just under 1,500 frames up, but we have quite a lot of material waiting to go in; like every respectable library or information unit, we have a backlog of material awaiting processing, so there's at least one aspect of this project which is traditional. Inputting is a rather slow job, because the information has to be carefully organized and structured; the routes from the indexing structure have to be decided and continuity of decision maintained, the information must be laid out properly so that the screen presentation is maximally legible, and the colours used have to be selected. There are seven colours, which vary considerably in intensity and subjective brilliance in contrast with each other and the general screen background—dark blue, for instance, is the screen equivalent of a muffled whisper—and although one's first impulse is to be very liberal in the use of colour, experience suggests that the use of two or occasionally three colours, on the lines of one for text and another for headings, produces the most readable results. There are also physical restraints on inputting. The editing terminal, which is basically a receiving terminal with a keyboard plugged into it, operates at about seven characters a second, which is slow, and the editing system is such that if a correction is required on a page, and this means altering the length of a line or a paragraph—if you want to delete 'county' and insert 'borough' for example—then the whole of the text following the correction must be rekeyed. On an on-line editing system, or using word-processing equipment, the system would make the change wherever needed and automatically reorder the text on one command, but Prestel isn't like that. This implies that the best way in future of doing input to Prestel would be to prepare the material off-line using something like an intelligent terminal, and input it in a machine-readable form, at high speed, at the end of a session. As well as the slowness of the present system, input operators experience considerable eye-strain, and around five hours a day with rest periods is about as much as it is reasonable to expect an operator to bear.

The information we are inputting is very varied in its format requirements, much more varied than, say, a base consisting of share prices and movements, and at present our input rate is of the order of 125 to 150 pages a week.

At the beginning, one of the earliest problems we faced was the definition of community information. In the event, we did not pursue a definition of the textbook kind, preferring instead to let this emerge pragmatically by seeing what sort of information our participating librarians felt was of local interest to the populations they are serving. You can best see what is included in our context by looking at the structure we have developed for ordering it. We were very aware that Prestel is going to be a service used by the public at large, a community not overly familiar with the use of indexes, and that people would be approaching our database with a problem to which they wanted a solution. We therefore had to produce something which would be simple to understand and use, as far as possible using ordinary everyday language. We also had to accept that the categories we would use would occasionally overlap, so we are prepared to make free use of cross-referencing from one of our pages in a particular category to a page in another, or if necessary to pages outside our own base, for example from a page specific to one borough to a GLC page.

When you get through the Post Office structure to the front of our database, perhaps by finding 'Local information' in the alphabetical list of topics, you see the page shown in Figure 15. If there were a lot more local areas in the service, this would clearly run to several pages, either by alphabetically listing all the



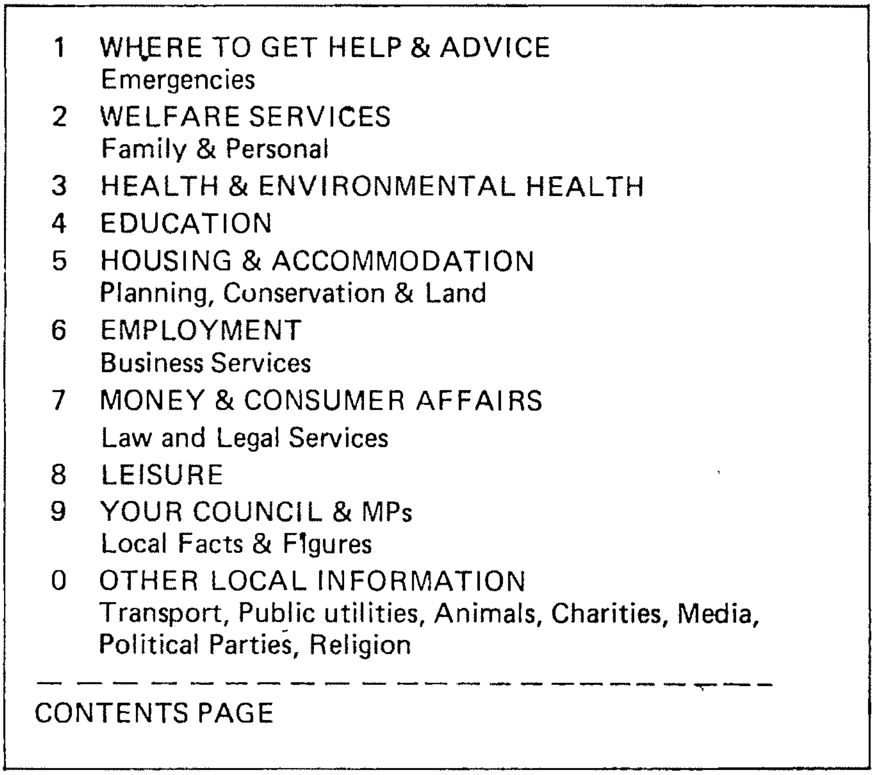
Aslib/Library Assoc
Local Information Data base

LONDON BOROUGHS
1 Bexley Local Information
2 Hounslow Local Information
3 Sutton Local Information
4 Waltham Forest Local Information

BIRMINGHAM CITY COUNCIL
6 Birmingham Local Information

NORFOLK COUNTY COUNCIL
8 Norfolk & Norwich Local Information

FIG 15

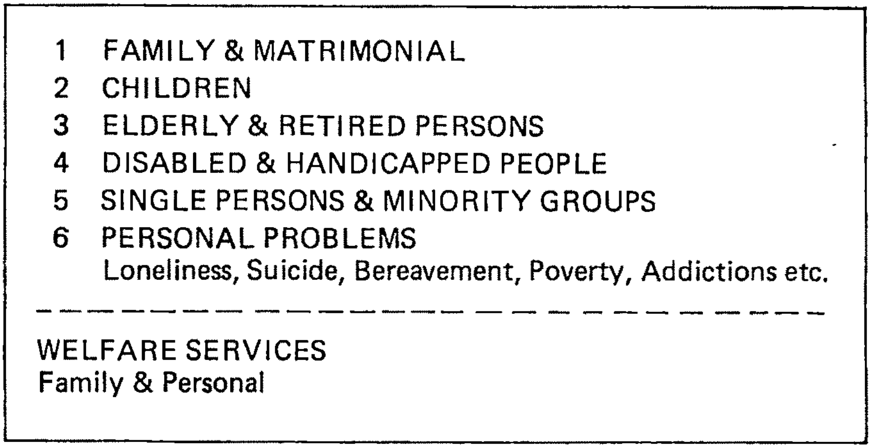


1 WHERE TO GET HELP & ADVICE
Emergencies
2 WELFARE SERVICES
Family & Personal
3 HEALTH & ENVIRONMENTAL HEALTH
4 EDUCATION
5 HOUSING & ACCOMMODATION
Planning, Conservation & Land
6 EMPLOYMENT
Business Services
7 MONEY & CONSUMER AFFAIRS
Law and Legal Services
8 LEISURE
9 YOUR COUNCIL & MPs
Local Facts & Figures
0 OTHER LOCAL INFORMATION
Transport, Public utilities, Animals, Charities, Media, Political Parties, Religion

- -

CONTENTS PAGE

FIG 16



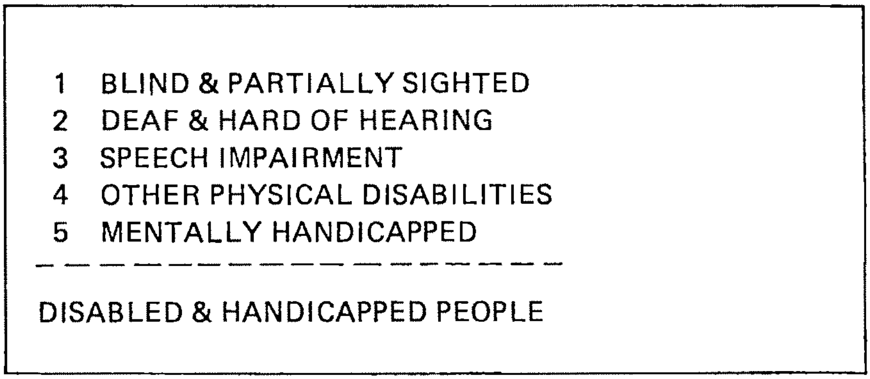
1 FAMILY & MATRIMONIAL
2 CHILDREN
3 ELDERLY & RETIRED PERSONS
4 DISABLED & HANDICAPPED PEOPLE
5 SINGLE PERSONS & MINORITY GROUPS
6 PERSONAL PROBLEMS
Loneliness, Suicide, Bereavement, Poverty, Addictions etc.

WELFARE SERVICES
Family & Personal

FIG 17

authorities, or by presenting a series of maps, moving from national to regional to local subdivisions. (Maps are not too easy to handle, because they have to be drawn in straight lines at the moment, but they can be very useful if kept simple.) Whichever of these areas you then select as being relevant to you, you then get the page shown in Figure 16.

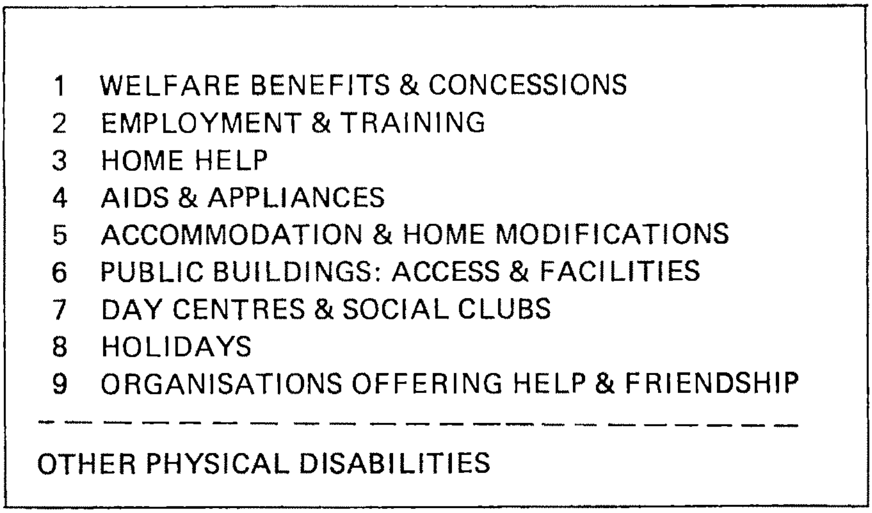
The only difference is that, as you can see, in the Norfolk file business services is replaced by business and agricultural services. The figures which follow are taken from a document prepared by Catherine Sullivan and David Oliver, the Aslib staff members who have been carrying out the two projects; this document gives the whole structure used in the database, developed after considerable discussion, and trial and error, with the cooperation of the participating librarians. This page then gives you an overview of the content of the base. If you think the last category is rather cluttered with an unrelated collection of topics, you must remember that we are restricted to ten subdivisions—Dewey



1 BLIND & PARTIALLY SIGHTED
2 DEAF & HARD OF HEARING
3 SPEECH IMPAIRMENT
4 OTHER PHYSICAL DISABILITIES
5 MENTALLY HANDICAPPED

DISABLED & HANDICAPPED PEOPLE

FIG 18

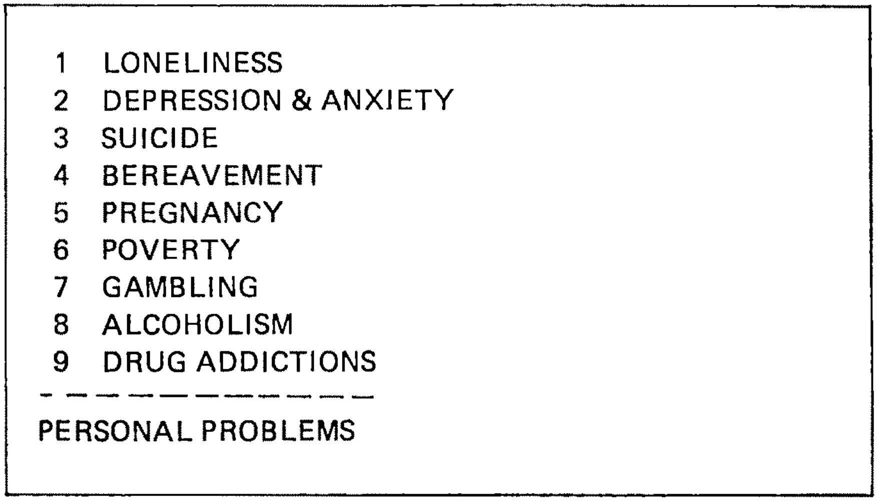


1 WELFARE BENEFITS & CONCESSIONS
2 EMPLOYMENT & TRAINING
3 HOME HELP
4 AIDS & APPLIANCES
5 ACCOMMODATION & HOME MODIFICATIONS
6 PUBLIC BUILDINGS: ACCESS & FACILITIES
7 DAY CENTRES & SOCIAL CLUBS
8 HOLIDAYS
9 ORGANISATIONS OFFERING HELP & FRIENDSHIP
- -
OTHER PHYSICAL DISABILITIES

FIG 19

would have loved Prestel—and we do not have very much room for putting scope notes after the categories.

To show you how the structure works, I shall follow a route beginning with 2, 'Welfare Services, Family and Personal'. Hitting 2 gets you Figure 17 and you will notice that on each of our structure frames we give at the bottom the title of the heading that was used to get to it, so that if the wrong button is pressed inadvertently users can see what's happened and can go back a page

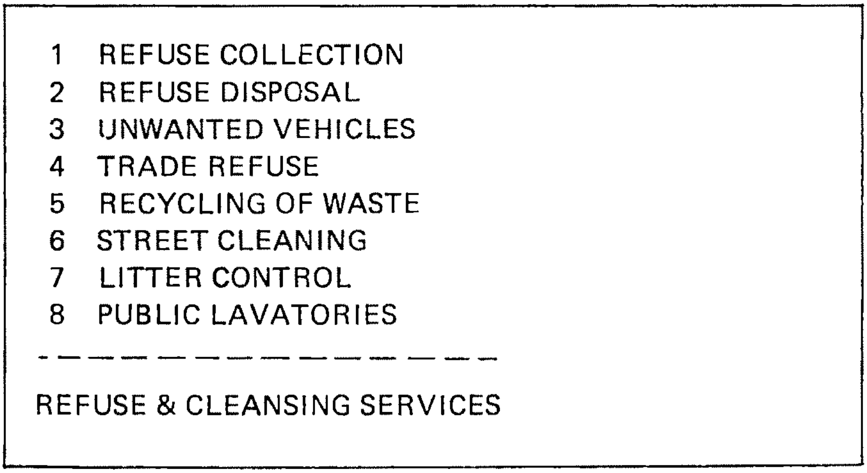


1 LONELINESS
2 DEPRESSION & ANXIETY
3 SUICIDE
4 BEREAVEMENT
5 PREGNANCY
6 POVERTY
7 GAMBLING
8 ALCOHOLISM
9 DRUG ADDICTIONS
- - - - - - - - - - - -
PERSONAL PROBLEMS

FIG 20

and get it right. Keying 4, 'Disabled and handicapped people' gets you Figure 18, a list of the major sorts of handicap. 1, 2, 3, 4 or 5 then takes you to essentially the same page, which is like Figure 19, except that 'Public buildings; access and facilities' is only found under 'Other physical disabilities', because there is unlikely to be anything under this heading for sufferers from vision, hearing or mental defects. The 'Mentally handicapped' page also has no heading for 'Aids and appliances'. Selection of one of these categories then takes you into the pages containing appropriate information. Under 'Day centres and social clubs', for instance, or 'Organizations offering help and friendship', users are presented with a list of clubs or organizations, with addresses and names of the secretaries or whoever else is the person to contact. Opening hours and a note of specific facilities available might also be given. This information generally runs over a number of frames, so the user moves from frame to frame by pressing the appropriate key. All of human life is in these structure pages; my favourite, because it seems to say just about everything there is to be said about the human condition is the breakdown of 'Personal Problems', which is shown in Figure 20. Who could ask for anything more?

Picking one or two pages at random now, 'Hygiene and public health' could lead us to Figure 21. 'Benefits, tax and national insurance' breaks down like Figure 22. The index page of information about the local council looks like Figure 23. You can see, then, that there is an enormous amount of information that can be packed into this base, and that we shouldn't have much difficulty in filling 8,000 pages for our six areas. If the information had to be gathered from scratch, the effort would be more than the average library could take on, but happily most library authorities already have extensive files of this sort of information and at the moment the problem is one of transcription. Some additional effort will be involved in some cases; where, for example, it is thought desirable to add something to a bare address to give a little more information.



1 REFUSE COLLECTION
2 REFUSE DISPOSAL
3 UNWANTED VEHICLES
4 TRADE REFUSE
5 RECYCLING OF WASTE
6 STREET CLEANING
7 LITTER CONTROL
8 PUBLIC LAVATORIES

- - - - - - - - - - - - - - - -

REFUSE & CLEANSING SERVICES

FIG 21

1 UNEMPLOYMENT BENEFIT
2 SICKNESS BENEFIT
3 MATERNITY BENEFITS
4 INDUSTRIAL INJURY CLAIMS
5 DISABILITY PAY & PENSIONS
6 REDUNDANCY PAYMENTS
7 RETIREMENT PENSIONS
8 INCOME TAX
9 NATIONAL INSURANCE

BENEFITS, TAX & NATIONAL INSURANCE

FIG 22

One problem we have not yet faced is that of updating, and we won't be able to make an estimate of the amount of effort this might require until the base is more or less complete. However, it is obvious that the public has a right to expect that the information it is buying is as current as possible, so some effort will have to be assigned to keeping the base up to date. We don't expect that any of the pages will be highly volatile, to the extent of requiring daily update, like share prices or the weather, but whereas some pages will be virtually unchanging for long periods of time—a list of public parks or cemeteries, for instance, is unlikely to change very quickly—there will be other whole sectors

1 YOUR COUNCIL
2 ORGANISATION/MANAGEMENT SYSTEM
3 PRINCIPAL OFFICERS & KEY OFFICIALS
4 MEMBERS OF THE COUNCIL
5 COMMITTEES
6 MEETINGS
7 A TO Z OF DEPARTMENTS

(Name of Borough, City, County or District Council)

FIG 23

of information which require substantial revision, probably at predictable intervals. The frequency of council elections is known, so you know when you will have to change the list of councillors. Lists of available evening classes are issued in the second half of the summer, and will probably be heavily used until enrolments are complete at the beginning of September. After the enrolment date, they could then possibly be dropped altogether, if space is needed for more urgent information. Calendars of meetings change continually, but could probably be maintained on a monthly update, and so on.

Having talked so much about input, it would be nice if I could say something now about the use of the base. Unfortunately, the market trial has taken longer than anticipated to get under way, and until very recently there were hardly any user terminals available. This was in part attributable to manufacturing delays, brought about by the necessity of ensuring that a malfunction in a terminal could not result in putting mains voltages on the telephone lines. Sets are now becoming more readily available, and as of 17 January 1979 there were 231 terminals actually installed and a further 464 awaiting installation. We look forward to seeing what usage this database attracts, because on the basis of such usage we can then modify both the content and the indexing structure.

The future

If we turn now to think about the future, there are two futures we can consider. One is the future of Prestel as a whole, and in considering this we could talk about the future development of closed user groups, which amounts to using the public system to store files relating to your own organization. We could talk about tele-ordering, a system whereby, for example, having called up a list of goods available from a particular supplier, you can select what item you wish to buy, key in a credit card number, and thereby purchase the item and have your card account debited automatically. We could talk about using the system for electronic mail, which allows you to put messages into the system. We could think about the possibility of conducting referendums or general and local elections, or opinion sampling, using the terminal as a voting station. Then, too, there will be the possibility of using the viewdata systems of other countries, since these can be accessed over the telephone lines. We can end up with a vision of the information millenium, when you need never stir outside the home, doing the shopping, booking the holidays, getting your education, entertaining yourself, maintaining your personal files, doing your job, perhaps, by using the facilities of the worldwide electronic office; until finally, after three days non-use of the system, the undertakers are notified automatically, your account is closed and you are hauled off to become just another record in the Great Database in the Sky.

I'm not going to discuss that future here. The other future, which I do want to think about a little, is the future of community information on Prestel, or to define it a bit more closely, the future of bases like ours created by public library systems. One of the major constraints on this future is the cost and effort involved in operating such a base. User costs are fairly straightforward. The user will pay the telecommunications costs of system use as a part of his normal telephone bill. In addition he will be separately billed for Prestel system use, and this charge will be based on a cost of so much a minute for being connected to the system, plus a charge varying from nothing to perhaps ten or twenty pence per page, which represents the payment to the Information Provider for the use of his information.

This payment is made to the Post Office, which then disburses revenue to the Information Providers. The input costs are slightly more complex. There are several sorts of discount available, and two classes of storage at present, but I am not convinced that these variations will form a permanent part of the system, so I shall only use what I expect to be the most common charge. This is a charge of £4,000 a year, plus a charge of £4 per frame of input per year; so that if you are an Information Provider with 1,000 frames, you have to pay the system £8,000 a year. In addition to this, you must have an input terminal; at present this involves a rental charge of £400 a year, but in future this is likely to go up, perhaps to around £1,000 a year, as more sophisticated and efficient terminals become available, with a facility for working off-line. Then you need an operator, at a gross salary cost of about £4,500 a year, including insurance and superannuation. One operator can, we guess input about 6,000 frames a year, which probably means he or she can input and maintain (*i.e.* update and monitor) about 3,000 a year. More than that number of frames means two operators, and probably two terminals. Then add on the telephone charges involved in getting the input into the system; at a rate of six or seven hours a day, our charges for this are running at £1,200 a year, including VAT, but with more efficient terminals, inputting from tape at reasonably high speed, this should be substantially reduced. I think it would be reasonable to add something like a quarter of an administrative-grade staff member for every 3,000 frames, to cover structure development and monitoring and so on, say £1,500 per 3,000 frames. So a notional costing for 3,000 frames is shown in Table 1.

Frame cost	£4,000+£12,000 =	£16,000
Terminal		400
Operator		4,500
Telephone		600
Supervisor		1,500
Overhead @ 50% of salaries		3,000
Total		26,000
Cost per frame		8.67

TABLE 1

This does not include the cost of generating or collecting the information, but it gives you an idea of the sort of sum you must find if you want to be an Information Provider, and the sum you must recover through page charging for use if you are a commercial operator. If you only have 1,000 frames to put in, your 'entry fee' remains the same, and the terminal cost, but you could probably get by with a half-time inputter, a third of the phone bill and half the supervision, a cost of around £13,300 or £13.30 a frame. If you have 6,000, the 'entry fee' is the same, but everything else doubles, so you have a frame charge then of £8. If my costing guesses are right, you are tending towards a lowest possible frame charge of a little over £7.33, on infinite input.

This is not too terrible a charge, and compares reasonably well with the cost of putting one abstract into a major abstracting service, which I have heard quoted at around twenty dollars. But it's a lot of money to find from a public library budget; it is properly a charge against the council budget, and if the local community is going to want this sort of information service then the council should make suitable budgetary provision. What these figures do is to point towards the practical sense of operating through what is called an 'umbrella' organization.

An umbrella organization is essentially a cooperative, in which a number of bodies come together to do their input through one central point, so that in the present project, Aslib is behaving like an umbrella organization for the six libraries involved. My personal view is that if local information is to be made available over Prestel, then it will be provided through a number of regionally-based umbrella organizations, handling the processing and input for the county or borough libraries in their regions. There is plenty of precedent for library cooperation of this kind. It has an added attraction, in that some input can probably be saved, by avoiding replication of entry, so that if, for example, the London boroughs were all under the same umbrella, there need only be the one block listing of evening classes, with indications of what was available at which centres, instead of a separate list for each borough, and welfare advice need not be replicated, only the addresses of local contact offices or people being specific to the local borough. This should cut input costs a little more, as would the possibility of reducing the overheads for accommodation and services by centralization. I said earlier that the LA–Aslib cooperation in this current project was an example of the sort of cooperation that I believe to be the basic ethic of our profession; I also believe that it is only by cooperative effort of the type I've just been talking about that we are going to be able to discharge this new part of our professional responsibility to the community.

Saudi Arabia: indigenous sources of information

Ziauddin Sardar

Information Consultant, Hajj Research Centre, King Abdul Aziz University, Jeddah, Saudi Arabia

SAUDI ARABIA IS one of the most rapidly developing members of the Organization of Petroleum Exporting Countries (OPEC). The rapidly growing economy of Saudi Arabia has a number of important features which make it quite different from any other major economy. With a growth rate of over 60 per cent, the Saudi economy is dominated by the petroleum sector. However, the growth rate of the non-oil sector, the diversification of which is the main objective of Saudi development policies, is no less spectacular: currently it is registering a growth rate of over 10 per cent. Agriculture accounts for about 3 per cent of the GDP, and manufacturing activities slightly less than 2 per cent. Net factor income payments to the rest of the world are negative and hence the gross national product is smaller than the gross domestic product.

It has been argued that Saudi Arabia now has a workable, if incomplete, infrastructure so that henceforth economic growth will produce fewer strains, because of the broader absorptive capacity of the economy.[1] However, development does not end with economic growth. The development of indigenous science and technology, industry and education, as well as channels of communication and avenues for the dissemination of results generated at Saudi universities and research institutions, are also important sectors of overall national development.

This paper is concerned with the indigenous sources for the dissemination of the information generated in Saudi Arabia on science and technology, industry and commerce, education and culture. The importance of developing these sources is somewhat recognized in Saudi Arabia, although progress in this area has been very slow.

Development and planning information

The basic development document on Saudi Arabia is the $200 billion *Second Five Year Development Plan* for the period 1976–80, adopted in April 1975. All the planning, policy and research work that is carried out in government agencies, independent institutes and universities comes within the framework of this plan: the entire exercise is geared towards the transformation of Saudi Arabia from a one-crop economy into a 'modern' industrial state with a diversified economic base. The development goals, as stated in the plan, are:

1. to maintain the religious and moral values of Islam;
2. to assure the defence and the internal security of the Kingdom;
3. to maintain a high rate of economic growth by developing economic resources, maximizing oil earnings, and conserving depletable resources;

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4. to reduce economic dependence on the export of crude oil;
5. to develop human resources by education, training, and improved health standards;
6. to increase the well-being of all groups within the society and foster social stability under circumstances of rapid social change; and
7. to develop the physical infrastructure to support achievement of these goals.

Implicit in these goals are two determinants of Saudi development policy: the first is the self-assertion of the Islamic identity of Saudi Arabia; the second is the emphasis on development of native resources. The developments in Saudi Arabia in the science, technology, educational and cultural sectors, as well as externally aided development programmes, must be seen from this perspective.

Development planning is carried out by five agencies which have been established for this purpose. All of these agencies are major sources of information on the development patterns of Saudi Arabia.

The main planning agency is the Ministry of Planning which succeeded the Central Planning Organization in October 1975. The Ministry of Planning is responsible for the preparation of national development plans and for monitoring the general trends and economic progress of the country.

Urban development planning is the responsibility of the Ministry of the Interior, while rural development planning and implementation is carried out by the Ministry of Municipalities and Rural Affairs. Saudi Arabia is divided into six regions: the *Riyadh* (core) region, the *Najd* region, the *Husa* (eastern) region the *Hadjaz* region, the *Jawf* (northern) region, the *Asir* (south-western) region, and *Rub al Khali* (the Empty Quarters). With the exception of *Rub al Khali*, which is a desert reserve, there are development plans for all regions.

The Saudi Arabia Monetary Agency (SAMA), created in 1952, has the sole and principal responsibility of overseeing all aspects of the central government's banking. SAMA handles the vast influx of oil revenues and is responsible for major government investments. SAMA's *Annual Report* is a much sought after document and its *Statistical Summary* (annual) is the chief source of information on Saudi cash flow and investments.

The Ministry of Petroleum and Mineral Resources (Petromin) is responsible for developing the national resources of Saudi Arabia and with using these resources for national industrial development. Petromin was created in 1962 and since its inception it has been involved with domestic as well as foreign investments in all aspects of the oil industry; it is also the sole domestic marketing agent for oil products. There are four other diverse operations that involve Petromin: geological surveying, drilling, marine petroleum exploitation and tanker shipping. It is also involved in mineral explorations, refining of oil and lubricants, and the manufacture of petrochemicals and fertilizers. The *Annual Report* of Petromin provide a summary of its activities. *Mineral Resources Research* (annual) is a major source of information on Saudi Arabian geological research.

The Industrial Studies and Development Centre (ISDC), formed in 1967 in consultation with the United Nations Development Centre (UNDP), has multiple responsibilities for the development of native industry. In particular ISDC is involved in:

1. conducting industrial research and feasibility studies;
2. giving advice on the formulation of industrial policies, plans and programmes and the implementation of industrial projects;
3. providing technical assistance to existing industrial enterprises; and
4. supervising planning, construction and operation of industrial estates.

The ISDC *Guide to Industrial Investment in Saudi Arabia* (annual editions) is an indispensable document for those interested in investment in Saudi Arabia. From time to time, ISDC also publishes a *List of Industrial Projects Existing and Under Implication in Saudi Arabia*. The ISDC *Guide* is an exhaustive document containing information on industrial structures and opportunities, industrial regulations and procedures, industrial law and taxation, and background information on infrastructures and related conditions. However, if the *Guide* does not furnish a particular piece of information, the ISDC will consider answering personal enquiries.

The Saudi National Centre for Science and Technology (SNCST) is the youngest development agency of Saudi Arabia. Created on 3 December 1977, SNCST is entrusted with the responsibility of supporting and encouraging applied scientific research and the coordination of activities of other local research and development centres in line with the *Second Five Year Development Plan*. Within the next few years, SNCST is expected to become an important source of information for indigenous Saudi science and technology. To realize this objective SNCST proposes to:

1. carry out scientific research programmes for application in the social and development domains in the Kingdom;
2. set up and administer a statistics bureau recording the labour force in science and technology;
3. set up and administer special laboratories in fields appropriate to the scientific needs of the Kingdom;
4. assist the private sector in developing industrial and agricultural production research associated with the increase in GNP;
5. support joint research programmes between the Kingdom and international scientific agencies;
6. set up and administer an information centre on domestic and international scientific agencies;
7. present a detailed plan that would realize the Kingdom's objectives in the technological field;
8. provide grants and scholarships to develop Saudi skills for scientific research;
9. provide grants to individuals and organizations involved in research that is beneficial to Saudi Arabia; and
10. coordinate the research efforts of government officials and scientific agencies and the exchange of information and expertise.

In addition to the above development agencies, there are two agencies that are devoted exclusively to channelling Saudi funds to development projects in the Third World: the Saudi Fund for Development and the Islamic Development Bank (IDB). The Saudi Fund is permitted by its charter to lend or donate funds to any developing country. The IDB makes loans only to Muslim countries which are members of the Islamic Conference. Both agencies have published their charters, which give details of conditions for loans, and both issue *Annual Reports* which list supported projects.

It is worth stating that the agencies mentioned above are expanding and increasing their activities rapidly; thus their importance as sources of information can only increase with time.

Science and technology information

Research and development activities in Saudi Arabia are concentrated in the semi-autonomous universities, although some research is also carried out in government ministries and agencies.

The Second Five Year Development Plan emphasizes four basic research and development areas: solar energy,[2] high technology agriculture, fisheries and water resources. Other areas of indigenous research are the geology of Saudi Arabia (which is the most extensive and intensive area of research), the Red Sea, arid zones and preventive medicine.

Of the six Saudi universities, four are active in research and development: the University of Riyadh (UR), the University of Petroleum and Minerals (UPM), King Abdul Aziz University (KAAU) and King Faisal University (KFU).

UR is the oldest and the most established university in Saudi Arabia. Besides pure science research in biology, chemistry and mathematics, UR has special centres for hydraulic engineering, drug analysis and control, plant oils, soil and salinity problems and solar engineering. The *Bulletin of the Faculty of Science* (annual), the *College of Agriculture Research Bulletin* (annual) and the *College of Engineering Research Reports* (irregular) are devoted almost entirely to the research work being done at UR.

UPM is the most modern technological university in the Middle East. Run in collaboration with the United States government, its major area of concern, as the name suggests, is petroleum and mineral research. Other areas of research at UPM are solar energy and science policy. The *Arabian Journal of Science and Technology* (bi-annual) published by UPM contains original papers of very high standard by the university's academic staff.

KAAU is the most rapidly developing university in Saudi Arabia. Amongst KAAU's specialized research centres are the Institute of Applied Geology, the Research and Development Centre, the Hajj Research Centre, the Institute of Oceanography and the Institute of Meteorology. A solar energy plant is under construction. Much of the research carried out at KAAU is published in the *Bulletin of the Faculty of Science* (annual) and the *Economic and Administrative Review* (annual). The *Bulletin of the Institute of Applied Geology* is published irregularly as are its *Research Reports*. The Hajj Research Centre publishes research reports and monographs and *Hajj Studies*, all of which are published irregularly.[3]

KFU is the youngest of the Saudi universities. Barely two years old, its basic research interest is in high technology agriculture.

Government ministries and independent research centres publish most of their findings in technical reports which are only selectively distributed. Two agencies which publish their findings in more accessible form are the Directorate General of Mineral Resources which produces *Geological Maps* and a *Mineral Resources Bulletin* (annual) and Hufuf Agricultural Research Centre which produces technical reports on specific projects.

Statistical information

There is considerable emphasis on the collection of statistics in the *Second Five Year Development Plan*. The main agency for the Kingdom's statistics is the Central Department of Statistics (CDS) of the Ministry of Finance and National Economy. COS publishes the *Statistical Yearbook*, and *Foreign Trade Statistics* (annual) which is also published in a digest form. CDS also publishes a *Cost of Living Index* and *Hajj Statistics*.

Most government ministries and agencies have special departments for the collection, analysis and publication of statistical data. The Ministry of Labour and Social Affairs, Labour Affairs Agency, publishes an annual *Statistical Handbook*; the Ministry of Agriculture and Water, Division of Statistics and Agricultural Economics, publishes an *Annual Report*; the Hydrology Division of the Department of Water Resources Development of the same ministry publishes a mimeographed *Monthly Data Bulletin*; the Economic Department of Petromin publishes an annual *Petroleum Statistical Bulletin*; the Statistics, Research and Educational Documentation Unit of the Ministry of Education produces annual *Educational Statistics*; SAMA publishes an annual *Statistical Summary*; the Arabian American Oil Company (ARAMCO) publishes annual *Facts and Figures* as well as an *Annual Report*. Almost all other ministries and many semi-government agencies are considering publishing or are about to publish some type of statistical bulletin.

Commercial information

The industrial and commercial strategy of Saudi Arabia is based on the encouragement of private enterprise and individual initiative. Thus the Government encourages foreign investors who wish to participate in the development of Saudi Arabia. Although the commercial laws of Saudi Arabia are complex, the investment code is liberal. Promulgated in 1964, this code encourages foreign human and technological investment, rather than contribution of capital funds. The main features of the code are:

1. It applies to all investments provided that they relate to economic development products, with the exception of oil and mining sectors which are governed by special regulations.
2. It extends to foreign investors all the privileges and protections enjoyed by Saudi investors.
3. It exempts investors from Saudi income and company taxes for a period of five years from the start of effective production, on condition that investments are undertaken within the framework of a joint company with Saudi capital holding a minimum 25 per cent (normally 51 per cent) equity interest.

4. It gives complete freedom for the transfer of capital abroad.
5. It allows a free flow of commercial information, through specialized agencies, to all foreign firms.
6. It requires no Saudi private or public capital in foreign companies.

Guidance on the code can be obtained from the Ministry of Commerce which also maintains the Commerical Registration Offices and the Department of Companies (which holds a Distinguishing Marks Register). The second main sources of commercial information are the five Saudi chambers of commerce located in Jeddah, Riyadh, Dammam, Mecca and Medina. Membership in these chambers is open to all industrial establishments (with the exception of those organizations which are on the black list of the Government) and the subscription varies according to the category in which the applicant desires to be classified. The best starting place for commercial information, however, is ISDC and its *Guide to Industrial Investment in Saudi Arabia.*

The Saudi Arabian Standards Organization (SASO) will furnish information on rules for granting control certificates, Saudi standards and specifications (which vary a great deal from city to city) for industrial, communication, power and construction infrastructure.

The two English language dailies, *Arab News* and *Saudi Gazette*, both published from Jeddah, have a regular page of local commercial and industrial news, including government tenders. *Saudi Review*, a daily mimeographed paper published by the Saudi Marketing and Publishing House in Jeddah, contains important summaries from the seven Arabic dailies.[4]

There are two English language weeklies both of which are particularly important for commercial information. *Saudi Business*, a weekly supplement of *Arab News*, carries news, trend analysis and interviews with important business personalities. *Saudi Economic Survey*, also published from Jeddah, is devoted entirely to factual information on tenders, new companies, proposed projects, commercial and industrial projects under completion and government commercial and industrial policy statements.

Cultural information

Under cultural information this paper includes information relating to history, religion, tradition, customs and peoples of Saudi Arabia. There is, of course, a reasonable abundance of cultural information in Arabic. In English, on the other hand, the indigenous sources are relatively few. *The Journal* of the Muslim World League (monthly) carries semi-scholarly articles on Islam and Saudi Arabia. *ARAMCO World* (monthly) is a glossy, well illustrated journal which carries popular articles of cultural interest. *Addarah* (quarterly) is published by King Faisal Research Centre in Riyadh and contains well researched, scholarly articles on tradition, archaeology and the people of the Kingdom. *Ahlan Wasahlan* is a glossy quarterly published by SAUDIA (Saudi Arabian Airlines). It contains popular and semi-scholarly articles on Islamic art and architecture, history and traditions of Saudi Arabia, and the progress and growth of the Kingdom. SAUDIA's book, *Across Saudia Arabia* (regularly updated), is the most popular general and cultural guide to Saudi Arabia.

Bibliographical control

As yet, Saudi Arabia does not have a national bibliography, not even union listings. However, the need for some form of bibliographical control of indigenous material is acutely felt and it is only a matter of time before something concrete emerges.

The libraries of UR, UPM and KAAU are now beginning to pay attention to national bibliographical needs. In particular, UPM and KAAU are rapidly working towards union lists of these holdings. UPM produces special (computer) bibliographies on certain topics of national interest; KAAU produces select bibliographies in hard copy form.[5] Most research and government organizations have special libraries which maintain some sort of bibliographical tag on Saudi material of particular interest to them.

External bibliographical control is also virtually non-existent. Both the Library of Congress and the British Library are supposed to receive books and monographs from Saudi Arabia under the International Exchange and Gifts Programme. However, very little indigenous material leaves Saudi Arabia, and virtually none of the technical report literature, most of it highly valuable, is actually indexed.

Saudi science and technology journals are abstracted in *Arab Science Abstracts* published by the Information and Documentation Centre, Egyptian Academy of Science, Cairo. *Bibliographic Index* and *Public Affairs Information Service Bulletin* index some Saudi material. Some of the on-line retrieval services, like Georef and BLAISE, also index a small amount of indigenous Saudi literature.

However, until such time as there are a National Library and a National Bibliography worthy of the names, indigenous Saudi literature will continue to suffer from acute neglect and lack of bibliographical control.

APPENDIX

Indigenous Published Sources of Information

Arab News, daily, Jeddah
ARAMCO, *Annual Reports*, Dahran
——, *Facts and Figures*, annual, Dahran
——, *ARAMCO World*, monthly, Dahran
Directorate General of Mineral Resources, *Geological Maps*, Riyadh
——, *Mineral Resources Bulletin*, annual, Riyadh
Hufuf Agricultural Research Centre, *Research Reports*, occasional, Hufuf
ISOC, *Guide to Industrial Investment in Saudi Arabia*, annual editions, Riyadh
——, *Lists of Industrial Projects Existing and Under Implication*, irregular, Riyadh
KAAU, *Bulletin of Faculty of Science*, annual, Jeddah
——, Research and Development Centre, *Economic and Administrative Review* (Arabic and English), annual, Jeddah
——, Institute of Applied Geology, *Bulletin of the Institute of Applied Geology*, irregular, Jeddah
——, Institute of Applied Geology, *Research Reports*, irregular, Jeddah
——, Hajj Research Centre, *Research Reports*, irregular, Jeddah
——, Hajj Research Centre, *Hajj Studies*, occasional, Jeddah
King Faisal Research Centre, *Addarah*, quarterly (Arabic and English), Riyadh
Ministry of Agriculture and Water, Division of Statistics and Agricultural Economics, *Annual Reports*, Riyadh

——, Department of Water Resources Development, Hydrology Division, *Monthly Data Bulletin*, Riyadh

Ministry of Education, Statistics, Research and Documentation Unit, *Educational Statistics*, annual, Riyadh

Ministry of Finance and National Economy, Central Statistical Department, *Statistical Yearbook*, Riyadh

——, *Foreign Trade Statistics*, annual, Riyadh

——, *Digest of Foreign Trade Statistics*, annual, Riyadh

——, *Cost of Living Index*, quarterly, Riyadh

——, *Hajj Statistics*, annual, Riyadh

Ministry of Hajj, *Pilgrim Statistics*, annual, Riyadh

Ministry of the Interior, Department of Municipal Affairs, *Urban Development Plans and Reports*, occasional, Riyadh

Ministry of Labour and Social Affairs, Labour Affairs Agency, *Statistical Handbook*, annual, Riyadh

Petromin, *Annual Report*, Riyadh

——, *Petroleum Statistical Bulletin*, annual, Riyadh

——, *Mineral Resources Research*, annual, Riyadh

Ministry of Planning, *Second Five Year Development Plan: 1395–1400 AH/1975–1980 A.D.*, Riyadh, 1976

Muslim World League, *The Journal*, monthly, Mecca

SAUDIA, *Ahlan Wasahlan*, quarterly, Jeddah

——, *Across Saudi Arabia*, regularly updated, Jeddah

SAMA, *Annual Reports*, Jeddah

——, *Statistical Summary*, annual, Jeddah

Saudi Business, weekly, Jeddah

Saudi Economic Survey, weekly, Jeddah

Saudi Gazette, daily, Jeddah

Saudi Review, daily, Jeddah

UPM, *Arabian Journal of Science and Technology*, quarterly, Dahran

UR, *Bulletin of the Faculty of Science*, annual, Riyadh

——, Research Centre, *College of Engineering Research Reports*, occasional, Riyadh

——, College of Agriculture, *College of Agriculture Research Bulletin*, annual, Riyadh

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2 For Saudi solar energy activities see SARDAR, Z. Saudis warm up to solar energy. *Nature*, 273, 29 June 1978, p. 700–701.

3 For the activities of the Hajj Research Centre see SARDAR, Z. The information unit of the Hajj Research Centre, *Aslib Proceedings* 30 (5), May 1978, p. 158–64.

4 *Saudi Review* will shortly be published as a major English daily from Riyadh.

5 KAU has produced three important bibliographies so far: *A Bibliography of theses and dissertations on Saudi Arabia*, *A Bibliography of Hajj* and *A Bibliography of the natural history of Saudi Arabia*; UPM has produced a comprehensive bibliography on the geology of the Middle East.

An illuminative evaluation programme for assessing information services

J. H. Pritchard, D. R. Streatfield and T. D. Wilson

Postgraduate School of Librarianship and Information Science, University of Sheffield

THE ACCOUNT OF illuminative evaluation contributed by Colin Harris to the October 1977 issue of *Aslib Proceedings*[1] was timely. Too little attention is usually paid to the effects of new information services or changes in systems. Evaluation will be a central concern of the next stage of Project INISS (a research project on the information needs and information services in local authority social services departments). The new stage of our work involves persuading social services departments to adopt some ideas for improving the communication of information, for a trial period. We intend to take an active part in introducing, monitoring and evaluating these innovations, all of which are low-cost, small-scale suggestions which offer real prospects of eventual adoption in other departments. Most of these innovations are familiar to information workers, but not to people in these organizations.

Colin Harris described how the researchers involved in the Travelling Workshops Experiment came to view illuminative evaluation as a means of assessing user education programmes and suggested that the method is potentially useful in other areas of information provision. Contradicting Shipman's suggestion that illuminative evaluation is popular in Britain as a 'consequence of having to evaluate after the action has started, with no chance of an adequate design and with very limited resources'[2] we decided at the outset to adopt a form of illuminative evaluation in our current work, to plan a programme of assessment based on this model and to ensure that the necessary resources are available to carry it out. The idea of publishing an account of our evaluation programme before it is carried out may seem bizarre but we believe that presentation of our ideas at this stage should stimulate further interest in evaluation of information services in general and this approach in particular. We would welcome reactions to the scheme proposed because an attraction of illuminative evaluation lies in the claim that it is both adaptable and eclectic.[3]

Why illuminative evaluation?

Project INISS has adopted this evaluation model because it appears to be appropriate for an innovatory project which places heavy emphasis on information gathering. We have adopted the following basic evaluation model:[4]

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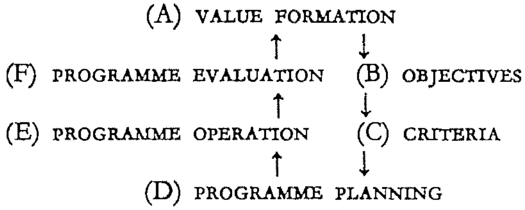

Stage A—Value formation

The dominant values in our proposals are those of the information professional:

- —that effective information flow (communication) is essential for the proper functioning of organizations, and consequently,
- —that improvements in information flow are ends that ought to be desired by organizations.

Apart from the support that these values are given in the literature[5] the Project INISS research team found support in the course of its field investigations. For example, throughout Project INISS fieldwork, both social workers and administrative support staff appeared to be relatively uninformed about information sources and the organization and control of information systems, and the research team observed detrimental results of this state of affairs. Consequently, an innovation involving training in information handling was developed. Further support was found in the fact that newly appointed staff in a social services department spend a great deal of their time assimilating information and identifying valuable contacts within the department. Within a social services department there is a demand for information about a range of services for a variety of client groups, and expertise is usually acquired through training, job experience and individual interests and involvements within and outside the department. Clearly, this too is detrimental to the functioning of the organization; the professional values of the team, when applied to this issue, suggested that the process of familiarization could be assisted by introducing an index of expertise aimed at newly appointed staff (although we recognize that getting to know the department will still take time).

Stage B—Objectives

The objectives for each innovation are derived from the overall aim of the project, to improve information services in local authority social services departments. The objectives in an illuminative evaluation model are broad because narrow objectives may fail to provide information on potentially more significant outcomes. They must be stated in clear terms but allow for flexibility in application. The objectives are derived directly from the formal statement of values for each innovation. For example, it is the objective of the training innovation to assess the effectiveness of developing training courses as a means of improving information handling skills of social services staff.

Stage C—Criteria

Having stated the objective of each innovation, the criteria for meeting that objective have to be determined. Some of the criteria identified by the research team are common to all the innovations:

1. The innovation must be accessible to its users.
2. The innovation must reflect individuals' needs.
3. Selection of information for use in an innovation should be made by applying explicit criteria.
4. The purpose, scope and content of the innovation must be recognizable to the users.
5. Some aspects of the use made of the innovation must be measurable or, at least, identifiable and capable of being reported.

Other criteria are specific to a particular innovation. These might be concerned with the department, the participants or the innovation itself (in most cases the specific innovation can be identified from the form taken by the example). Examples include:

1. The department must have an active training section (in order to mount an information handling course).
2. The department must be capable of distributing copies of the *Social Work Information Bulletin* to the list of recipients within twenty-four hours of receiving them.
3. The background papers should be readily available to all social services staff involved with relevant committees.
4. The staff should be willing to indicate what journals they wish to receive.
5. The book collection must be available to users within defined limits, for example, the county libraries' rules and regulations.
6. The index of expertise must be flexible, easily maintainable and readily updateable in order to be effective for the future.

Stage D—Programme planning

This stage can be divided into two parts:

D^1—preliminary planning, which involves testing the objectives and criteria;
D^2—production planning, which is the preparation for implementing the innovation.

Stage D^1—Preliminary planning

The first step in all cases is to gain access to the social services departments, and, where appropriate, to public libraries' departments. Participant areas of the department will then be identified and these will bear the brunt of later evaluation regardless of whether the innovation is applied on a department-wide or narrower basis. Discussion of the objectives, criteria and the innovation in general will be conducted with staff from the chosen areas as an essential step in the negotiation. If agreement is reached about implementation of the innovation a steering group will then be set up to implement the programme. Individual contacts of potential value within the department will be identified at this stage.

The objectives and criteria set out above were evolved by the research team before negotiations began. We accept that some modification of both objectives and criteria are likely as a result of discussions with staff during preliminary planning.

It is recognized that part of this negotiation procedure will be concerned with a discussion of the basic 'information' value and with how far it is in conformity with organizational values and with the values of those following a different profession. Fundamental, irresolvable conflict at this level of values would clearly prevent the negotiations from proceeding further. To date, however, our experience suggests that there is likely to be relatively little conflict of this kind when the following conditions obtain:

—the staff affected are drawn into the negotiations at an early stage;
—organizational managers have been made aware of the consequences of ineffective communication systems;
—the amount of resource redistribution required is minimal;
—the innovation can be shown to be supportive of more dominant organizational values;
—the data-collection procedures can be shown to have little effect on the members of staff involved; and
—the project staff are seen as working in a 'helping' role rather than an academic 'research' role.

Stage D²—Production planning

The steering groups will be formed so as to ensure adequate involvement by staff of the departments in decision-making leading to the development of each innovation to meet the objectives as conceived locally. Steering groups are also intended to provide a communication link between the research team and various levels of staff of the departments involved and to help collect relevant data.

Testing the objectives and criteria associated with an innovation may involve various methods and measuring instruments including observation, interviews, questionnaires, case studies and decision theory. Which methods are chosen will depend on the different problems encountered with each innovation, decisions of the steering group and advice received by the research team from various sources. In fact, no data collection method or evaluative technique is ruled out: where they apply, and where they can be realistically employed, the classical methods such as control groups will be used.

Stage E—Programme operation

Each innovation will operate for one or more trial periods but the programme operation will depend on the decisions of the steering groups.

Stage F—Programme evaluation

After each innovation has been tried out it will be necessary to reapply the evaluation model. This involves attention to the same overall set of developmental stages as are shown above. The illuminative evaluation process is cyclical and the whole evaluation process itself must in turn be subjected to evaluation. Consequently, an eighth stage, not shown in the model, will involve assessment of the evaluation process following stages A to E.

Programme evaluation will involve taking account of:

1. how values, objectives and criteria were determined by the evaluators (stages A, B and C);
2. how objectives and criteria changed over the various stages of the evaluation process;
3. how procedures were set out for the innovations (stage D^1);
4. how data were collected (stage D^2);
5. how the innovations were produced (stage D^2);
6. how the innovations were utilized (stage E);
7. how effective the initial proposal of investigation and the programme as a whole were;
8. how effective the evaluation process was.

This whole process will make considerable demands upon the research workers who will have to reflect upon their activities and experiences in a rigorous manner and to an extent not commonly associated with evaluation on the classical, experimental model.

Conclusion

None of the steps described above are in themselves likely to be new to people introducing new information services or modifying existing ones. Systematic application of the evaluation model described should, however, provide the means for effective assessment of an innovatory programme. If illuminative evaluation can be adopted for Project INISS, it is likely, as Colin Harris has suggested, that this method would be suitable for evaluating other programmes concerned with information provision because of its flexibility. From what has developed so far, it seems that the model of illuminative evaluation is appropriate for the work to be carried out by Project INISS. At the preliminary stage in the project the basic evaluation model has been applied without difficulty to each of the proposed innovations. It has been possible to outline the stages of the evaluation process for each innovation, and certain steps within particular stages are common to all the innovations. The illuminative model has so far provided adequate flexibility, and this is clearly shown at stage C above, where many of the criteria are specific to one innovation.

The whole process of evaluation is still faced by serious obstacles. For example, policy makers are often reluctant to make the initial investment needed for evaluative research, and even if the investment is made the findings of the evaluation are often ignored. Researchers themselves face problems of measurement and design involved in the evaluation process, and the present trend seems to be towards a more diverse spectrum of methodologies. Progress will be made if evaluators can incorporate the scientific rigour of the classic research model into the flexible illuminative research model, which can in turn be adapted to the needs of the programme being evaluated and to the constraints of working organizations.

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The meaning of 'about' in fiction indexing and retrieval

Annelise Mark Pejtersen

The Royal School of Librarianship, Copenhagen

IN ACKNOWLEDGEMENT OF the key position of the concept of 'aboutness' in the indexing process, the definition of the term 'about' seems to have become the crux of the discussion about indexing systems.[1] 'About' is not a simple and self-evident term in the process of indexing, and the earlier view of a one-sided relationship between the term and the contents of documents is called into question. A new definition of 'about' is needed and a short review of recent contributions on the subject will illustrate some of the suggestions put forward for operational and functional definitions of the 'aboutness' of documents. The problem has also been tackled through experiments on alternative design criteria for indexing schemes (Swift *et al*).

The present contribution to the debate represents an approach which integrates the model and construction of an indexing system with a definition of 'about'.

Two principal assumptions are proposed in this article:

1. The concept of 'about' should be defined on the basis of an empirical analysis of the formulations and needs of groups of users within a specific book stock.
2. Users' needs are multi-dimensional and the definition of 'aboutness' should reflect the different aspects of a general reader's needs. An indexing system should be closely related to the users' formulations of their needs and to their criteria for choosing books.

The success of an indexing system depends on the degree of agreement between the system's and the users' concept of aboutness, which in turn indicates the necessity for a multi-dimensional structure. An indexing system for fiction has been designed along these lines and illustrates an alternative approach to the problem of 'aboutness'. It is presumed, perhaps prematurely, that similar approaches within other fields might be appropriate.

Examples of 'about' definitions

Attempts at developing a theory of the position of 'about' have been made by Maron[2] with respect to searchers' and users' question-behaviour and by Hutchins[3] with respect to their need for information in terms of the presupposed level of knowledge in documents.

M. E. Maron's operational definition of 'about' takes into account the expected behaviour of a document's potential users when searching and asking for a document. Thus the indexing term chosen when deciding what a document is about should be identical with the most likely 'about' question asked by the user whose need the document would satisfy. He distinguishes between a sub-

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jective and an objective interpretation of 'about'. Maron objects to the subjective interpretation because it refers to the complex relationship between a document and the subjective, personal 'inner experience' of its readers. Opposed to the 'internal point of view' is the objective concept of 'about' which is preferred by Maron because it refers to an external behaviour of asking and searching that would be observable in a retrieval situation.

According to W. J. Hutchins the definition of the 'aboutness' of documents should be formulated 'in terms of the knowledge presupposed by the authors of the texts', since the user can express what he knows but cannot define his need for further information, the nature of which he does not yet know.

Apart from individual motives, readers generally expect to learn something new and improve their present state of knowledge as a result of reading a book. The basic condition for satisfying a user is the availability of information about the author's presuppositions about his reader's knowledge.

Hutchins' examination of the 'about' concept is influenced by his linguistic theory of text structure concerning two types of text progressions which involve the relationship between elements of *given* information and elements of *new* information.

Similar principles are involved in the discourse between writers and readers, since any writer must have presuppositions about his potential readers' given information.

Swift *et al*'s[4] experiments on retrieval strategies with indexing systems in the social sciences reveal insufficiencies in the notion of 'about' since needs formulated as 'about' questions refer to various aspects of documents which the system's interpretation of 'about' does not cover. The differing uses of the term 'about' depend on the searchers' employment of various frames of reference. A multi-modal indexing system is introduced which consists of several dimensions representing different ways of characterizing documents. Under each heading a number of different aspects of documents are introduced.

In addition to the factors included in their own definitions of 'about', both Maron and Hutchins enumerate other items of relevance to the achievement of user satisfaction. Maron argues that output documents in response to a search query should be ranked according to their probability of satisfying the user's needs and not according to their degrees of 'aboutness'. He mentions text properties such as, for example, comprehensibility, style and timeliness, which might contribute to its probability of satisfaction. Although Hutchins' 'about' criterion would result in the proper match of users and texts 'that progress from already familiar territory', and although he defines user satisfaction according to the improvement of his knowledge, Hutchins states that dissatisfaction may be caused by other failures of communication between author and reader. However, both Maron and Hutchins agree that the aim of providing the necessary supplement of quality-relevant aspects is *not* within the concern and responsibility of indexing systems. This may express a conflict between the implicit idea of 'about' as covering primarily a one-dimensional subject-matter aspect and practical experience which demonstrates that *several* aspects are of actual importance to users' needs. Naturally the subject-matter information is of great importance, but search efficiency would benefit from the extensions of the definition of 'aboutness'; included would be specifications of other text properties which have proved equally relevant to users as criteria of choice and as conditions for satisfaction of needs. This is realized in the fiction scheme to be described, and similar ideas seem to lie behind Swift *et al*'s multi-modal indexing system.

In the same way, an empirical analysis and a more developed theory of 'topic at a level which is appropriate to the users' present knowledge of the subject' (Hutchins) as part of the concept of 'about' may imply changes in the selection of index terms, although at present Hutchins doubts that his definition of 'about' would have any practical implications.

Maron's operational suggestion about the indexing procedure, 'thus for an indexer to ask the question of what a document 'is about', is to answer a question about the expected request or search behaviour of those who would be satisfied with that document', leads to a discussion of the similarity between the world views of the indexer and the user, especially the indexer's image of content and structure of eventual user-requests. Maron's solution is based on the neutral and objective observation of borrowers 'behaviour' which the indexer's image of users and choice of index terms should refer to. Difficulties may arise here, since the main part of the request/book correlation is usually rather intuitive and it is most likely that many of the habits of the users are based on subconscious attitudes and associations which cannot be consciously formulated. 'The inner view of the reader' (Maron) is the fundamental frame of reference for comprehension and interpretation of most users' requests and criteria of satisfaction. The indexer must possess knowledge and experience of the structure of users' needs, including the relationship between a document and the subjective inner experience of its groups of readers.

Due to psychological factors there is often a 'gap' between users' requests and their real needs. If we are to create an adequate superordinate system, which is compatible with users' requests and needs, then the subjective and subconscious reading experience and book characterization of users from different viewpoints based on their needs and interests must be integrated in the definition of 'about' employed by the indexer. In this way, we can avoid the search difficulties which are likely to arise from formulating a relevant search strategy among documents that are not indexed according to needs but according to request-behaviour. As a consequence, the indexing scheme should define the boundaries and attributes of a reasonable and handy number of aspects within several of the dimensions which characterize the documents in relation to users' needs.

Such an indexing theory applies to general information services, where the success of an indexing system is not measured by its ability to retrieve all relevant documents but instead depends on its capability for retrieving a few suitable documents. Investigation of groups of readers' use of a limited category of books is necessary in order to gain experiences with this theory of 'aboutness' in indexing. The following section presents such a study of readers' 'about' definition and the design of a related indexing system for general users of fiction.

Fiction users' concept of 'about'

A study of actual user–librarian conversations recorded under everyday library conditions in Danish public libraries in 1973 and 1976,[5] comprising about 300 conversations, revealed that the readers' 'about' concept is multi-dimensional, and it proved how the individual users characterized book-contents from several different view-points. The analysis of their descriptions of needs and book properties in relation to specific documents resulted in a structure of users' needs that demonstrates four dominant dimensions in their perception of what a book is about:

1. subject-matter,
2. frame: time, place, social environment, profession,
3. author's intention/attitude,
4. accessibility.

These dimensions do not exist as four isolated, independent needs at the same level and with the same importance in the users' interpretation of 'about'—even if requests based on these categories are likely to be formulated as being of equal importance. When contacting the librarian, the users either describe their wishes directly within these dimensions, or the subsequent conversation with the librarian reveals implicitly their actual desires in terms of these categories.

A piece of user–librarian negotiation illustrates one user's definition of 'about':

User: *Would you recommend me a book?*
Librarian: *Yes, what would you like to read about?*
User: *I don't know, I've just begun to read books. But I like books with action, exciting, not too heavy or sad, and not too many difficult and strange names. And I only want one novel.*

This user's definition of 'about' represents several dimensions: 'action' refers unprecisely to the *subject-matter*, 'exciting and sad' refers to the *author's intention* of creating an emotional experience, 'heavy' probably refers to the *author's intention* of cognition/information, 'difficult, strange names' refers to the *accessibility* aspect of documents.

To satisfy this reader a search system must operate with a definition of 'about' that pays attention to relevant combinatorial possibilities of fitting documents to users' wishes. An operational definition must be restricted to a relatively few numbers of dimensions, but detailed enough to correspond to the readers' demands. The above-mentioned four predominant dimensions are divided into the following aspects, which are clearly defined in accordance with the readers' conceptions:

I. *subject-matter*
    a. action and course of events
    b. psychological development and description
    c. social relations
II. *frame*
    a. time: past, present, future
    b. place: geographical, social environment, profession
III. *author's intention*
    a. emotional experience
    b. cognition and information

IV. *accessibility*
  a. readability
  b. physical characteristics

There is no logical order in the established viewpoints. One dimension is not logically dependent on the other dimensions. They do not comprise uniform subjects, nor do they belong to one definable group, but they represent a combination of some of the functions and aspects of fiction. Each dimension and its subdivisions are coordinate and any relation between designations and subjects may be expressed.

The indexing procedure

This system is not exclusive since all characteristics may be found in the same book, and each book is indexed separately according to the different ways searchers may wish to access it. The indexing process progresses through four stages: identification of the aspects belonging to each viewpoint in turn; judgement of the predominance of identified aspects; selection of aspects of sufficient weight to satisfy the user who wishes a document with this element; book characterization in natural language along each dimension in relation to the subsequent relevant viewpoints. This book description offers the possibility of distinguishing between documents indexed according to the same aspects.

Search strategy

Even with a low number of divisions in the four dimensions, the resolution of this scheme will be high due to the number of possible combinations. The redundancy caused by its inexclusivity can be of great help to the searcher in his determination of a user's desire, since information about the title of a book mentioned by a user may become some sort of cross reference initiating searching in fields not very obvious from the user's original request.

When the searcher has placed the user's information in this reference system, he can ask relevant questions by searching dimensions and viewpoints and offering suggestions along these four dimensions. It is only after several questions and answers centred around a number of books or subjects with some common features that the searcher is able to conclude which dimension(s) and viewpoint(s) really represent the reader's need. Even though the searcher selects a single viewpoint or a combination of viewpoints, he will have simultaneous access to information about the other indexed qualities of a document. This makes it possible to experiment with alternative combinations and to propose new possibilities to improve the reader's knowledge and reading interests.

A short user–librarian conversation from the investigation illustrates how a simple one-dimensional concept of 'aboutness' fails in the search procedure and shows how this alternative 'aboutness' definition will improve the search profile. Furthermore, it demonstrates how the proposed indexing scheme can be used to identify users' needs as well as to search the target material.

Borrower: *I see there's nothing here by Soderholm. Have you anything by Cavling or Slaughter?*

Librarian: *We have nothing by them, unfortunately. Aren't there any others you might like?*

Borrower: *Preferably a novel about a family.*

Librarian: *Have you read the 'Jalna' books or 'Svarkeslagten'?*

Borrower: *Yes.*
Librarian: *Have you read Linnemann's 'The house with the green tree'? It's in two volumes and tells about a merchant's family in Copenhagen and in the West Indies.*
Borrower: *Well.* (Accepts the book.) *I'd also like an entertaining book—some easy reading.*
Librarian: *What about 'Countess Danner' by Eva Hemmer Hansen? It's both easily read and very entertaining.*
Borrower: (A little reluctant, hesitates and takes the book along).

In this case the user asks for a novel 'about a family'. Though the librarian suggests novels about a family, the user doesn't seem content. The librarian's search procedure is based on the subject-matter concept of 'about' and his suggestions for novels about families are reasonable enough from his point of view, except that an important characteristic of the books he suggests has to do with the historical frame and a correlated author's intention of communicating cognition/information to the reader. On the other hand the user supplements her subject-matter perception of 'about' with aspects as 'easy and entertaining', which inform about the desired author's intention and the accessibility. In this situation, divergent definitions of the 'about a family' notion combined with the librarian's ignorance of the multi-dimensional 'about' interpretation made by users, results in search failure.

The one-dimensional search profile of subject-matter is not sufficient to cover possible combinations of viewpoints in either book contents or users' demands. This illustrates how the popular, one-dimensional genre-classification causes problems, when it serves as a frame of reference in the communication between user and librarian.[6] The identification of this reader's need from her request for authors/titles or information of what she has read cannot be fruitfully carried out unless the librarian can retrieve relevant information from the indexing system about these references. Common features in users' references revealed by the indexing system supply the searcher with the individual user's definition of 'about'.

In the present example, a three-dimensional concept of 'about' is found: *subject-matter*: course of events: love affairs, family life, marriage; *author's intention*: emotional experience: suspense, romance, entertainment; *accessibility*: readability: easy. Individual features are found in the *frame* aspect which seem to refer to both past and present, and thus indicate that time is of little interest to the user. *No* authors/titles mentioned by the user are indexed under author's intention of cognition/information. Thus on the basis of the mentioned authors/titles and the entire negotiation combined with the indexing of books referred to by the involved persons, one might further extend the structure of this user's 'about' concept to include a *not wanted* aspect: author's intention of cognition/information.

Concluding remarks

The fiction indexing system is a helpful framework in the searcher's problem solving analysis and diagnostic decisions, and it responds with references corresponding to the searcher's image of users' needs.[7] The approach described in this article has proved successful in teaching indexing of novels and search strategy in fiction, as well as in experiments with the development of auxiliary tools such as card catalogues and printed catalogues for fiction in public libraries.

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GREMLIN: a co-operative local government information service

Tony Preston

Information Officer, Metropolitan Borough of Rotherham

In MID-1977 the Greater Manchester Reference & Information Sub-Group (a working party of librarians representing the ten public library authorities in the county) set out to create an inexpensive but workable local government information service which would be available to any of the local authorities who wished to participate. Of the ten constituent districts, only Stockport had a full-time local government information officer. One of the main features of Stockport's service was a weekly current awareness bulletin, using input from about a hundred journals. Oldham and Tameside were assisting Stockport by scanning extra journals and providing relevant abstracts and photocopies; in return they were receiving copies of the Stockport bulletin. Tameside staff were using this bulletin to help produce their own irregular information bulletin on a reduced scale and, like Stockport, were supplementing it with a photocopy supply service. Salford had produced independently for two years a fortnightly current awareness bulletin. Provision in the other districts was minimal.

We discussed possible methods of building a similar service for other interested local authorities in the county, all of which were conscious of this gap in their provision. A YADLOGIS-type approach[1] was considered, but it was finally agreed that the most practical solution would be to establish a service based on the existing Stockport model. I was asked to investigate what sort of facilities Stockport could offer.

It became apparent that a production could be put together which would have clear advantages both for Stockport and for other participants. The text of the Stockport bulletin could be simultaneously printed on to headed paper designed by other library services, so that to all intents and purposes Bolton or Rochdale would have produced its own bulletin for its own users. The printing unit in Stockport Town Hall was happy to co-operate, since it would be as easy to print, say, 1,000 copies as to print the existing 270. The headed top sheets would be supplied by each local authority to its own design, but to Stockport's specifications, *e.g.* in quality of paper, and maximum area to be covered by the heading. Supplementary sheets would be supplied by Stockport, which would recharge only the cost of this extra paper and a proportion of the total printing cost. The text of each issue would be preceded by the legend: *Produced in Stockport by Greater Manchester libraries in co-operation.*

It was eventually agreed that the scheme would go ahead from June 1978, on a twelve-month experimental basis. Stockport would maintain its existing print-run of 270 copies per week. Bolton, Rochdale, Bury and Wigan would receive 100 copies each, while Oldham would receive fifty (since increased to

Aslib Proceedings, 31 (5), May 1979, p.258–260. Printed in Great Britain

sixty) and Trafford twenty-five. (All participants are free to review their requirements at any time.) Tameside and Salford would not be joining the scheme at present since both wished to continue to produce a bulletin tailored more closely to local needs. Manchester was about to set up its own information service. Participants agreed to scan extra journals in order to increase coverage. The advantages to Stockport were thus additional input to the bulletin at no extra cost, and a reduced printing bill. Other participants would receive their own current awareness service at minimal cost (about two pence a copy).

We thought it would be useful to devise a name for the scheme, if only to have something by which to refer to it. After some thought we agreed to the acronym GREMLIN (Greater Manchester Local government Information Network).

There were, of course, a number of problems to be overcome. It was soon realized, for example, that the existing subject headings, based on Stockport's divisional structure, would have to be replaced by a set of more general headings of equal applicability to all participants. I was a little worried about reaction in Stockport, but when I eventually introduced a set of twelve new subject headings not a single complaint was received, much to my relief.

Distribution of the printed copies every week could have been a problem. Speed was essential if the currency value of the bulletin was not to be diminished, yet no one wanted to see the benefits of the scheme eroded by high transport costs. The solution presented itself in the shape of the North West Library Transport Scheme, a daily van service co-ordinated by the North West Regional Library Service and the British Library. We arranged for copies to be collected once a week from the library at Stockport College of Technology, the nearest existing pick-up point, and for their delivery the following day at a named point in each district. Participants would be charged sixty pence per bundle, which would be prepaid by BLL forms, supplied to Stockport in advance by each library service. Apart from one or two teething troubles, the distribution side is now working well.

Probably the major problem was the provision of an efficient and reliable photocopy back-up service. Because no single library has access to the full range of journals abstracted in any one issue of the bulletin, photocopies have to be obtained regularly from other libraries. In most other co-operative schemes—for example, YADLOGIS in Yorkshire, and LORIS in the Midlands—a library faced with this problem simply goes direct to whoever was responsible for the original indexing. In GREMLIN this is not possible, since 90 per cent of the scanning is carried out in Stockport, and to use the 'original indexer' approach would place an impossible burden upon them. On the other hand, to allow a library to approach any other library which happens to possess the journal in question would mean that those libraries with strong periodical holdings, like Bolton and Rochdale, would tend on average to be putting more into the scheme than they were getting out of it. So we set out to compile a fairly sophisticated union list of the hundred or so core journals used in the scheme together with instructions as to which library to go to for which journal. Manchester and Stockport were excluded from this list, but all other libraries agreed to co-operate in this side of GREMLIN.

In order to spread the load as evenly as possible, we assigned to each journal a 'points' system based on two factors. Firstly a journal was assigned a crude score according to the degree of use made of it in the bulletin. A weekly journal which was always used (*e.g. Municipal Journal*) scored four. A monthly or quarterly always used, or a weekly only occasionally used (*e.g. Municipal Review* or *New Scientist*) scored two. A monthly or quarterly only occasionally used (like *Cheshire Life*) scored one. This crude score was then multiplied by the number of libraries on the list *not* subscribing to that journal. 'One' was then added to the total, and that represented the final score. In practical terms this would mean that *Local Government Review*, subscribed to only by Tameside, achieved the maximum score of 29: $(4\times 7)+1$. *Local Government Chronicle*, available everywhere, achieved the minimum score of 1: $(4\times 0)+1$. Journals were then assigned to libraries systematically (with due regard to actual holdings), with the aim of making the total score for each library as even as possible. This aim, by and large, was achieved.

These final scores thus reflected fairly accurately the degree of commitment that a library service was taking on by assuming responsibility for a particular journal. Trafford, for example, ended up with a relatively large number of low-scoring journals, while Tameside ended up with a relatively small number of high-scorers. As a result, both should be called upon to supply roughly the same number of photocopies during the twelve months of the trial. GREMLIN members are now theoretically independent, both of Stockport and of the British Library, in coverage of those journals indexed by the service. In practice there are still one or two gaps in provision which Stockport is filling at present; and additional journals outside the core list are used from time to time, which Stockport will usually have to cover. All photocopies, incidentally, are supplied free of charge on a reciprocal basis, although Manchester Central Library, if called upon, is obliged to charge a small fee.

GREMLIN is a limited scheme based on a specific set of circumstances and on a limited geographical area. The metropolitan boroughs which make up its membership share largely common interests. The highly centralized basis on which the production side operates is not particularly democratic (though very fast, cheap and efficient) since Stockport has the overriding say as to what goes into the bulletin week by week, and it may well be that the particular circumstances which led to GREMLIN's inception will not be found elsewhere in the country. Given this, we would hesitate either to offer GREMLIN to other local authorities or to advocate it as worth copying elsewhere. Nevertheless, we have created a viable model which is working smoothly and efficiently within its own limited parameters, and I am confident of its surviving its twelve-month trial. My successor in Stockport, Mrs Noreen Renshaw, will be happy to give further information about the problems we faced and the solutions we found.

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This is another in the Institute's Monograph Series intended 'to fill . . . the considerable gaps in the monograph literature' of information science; the book aims to help information specialists and system specialists to understand each other and their different needs. It is in five sections: preliminary ideas; initial system study; storage-systems, files, records and fields; search strategies—retrieval; conversion to the final design and implementation. Appendix 1 covers the elements of programming; appendix 2 has an eight-page glossary; appendix 3 lists the speeds of some peripherals.

Letter to the editor

AGRICULTURAL PROCEEDINGS OMISSION

I am sorry to have to inform you that I inadvertently left out details of two papers of an Aslib Biological Group meeting on agriculture published in *Aslib Proceedings*, March 1979 31 (3). They had been previously published in a collection of papers by K. G. Saur Verlag K.G. I had obtained permission from the editors and the publisher to republish these papers providing due acknowledgement to the original was made. I have, of course, written to both to explain the omission was entirely my fault and in no way the responsibility of Aslib and a correction follows:

The two papers, by J. R. Metcalfe and by D. E. Gray and S. M. Johnson, which appeared in *Aslib Proceedings* 31 (3), 110–17; 129–35, were originally presented at the 1978 European Regional Congress of Agricultural Librarians and Documentalists. They were reprinted, with permission, from pages 69–80 and 173–83 of *Moderne Systeme and Informationsnetze und die Zuverlässigkeit der Information*: Kongressbericht; Hamburg, 17–22 April 1978. Modern systems and networks and the reliability of information. Systèmes et résaux modernes et la fiabilité d'information. Europäischer Regionalkongress des Bibliotheksweseens und der Dokumentation der Agrarwissenschaften, International Association of Agricultural Librarians and Documentalists (IAALD). The proceedings were edited on behalf of Gesellschaft für Bibliothekwesen und Dokumentation des Landbaues (GBDL) by H. Haendler and H. J. Friede. They were published by K. G. Saur Verlag K. G., Munich, New York, London, Paris. (ISBN 3-598-07096-9 Munich; ISBN 0-89664-095-7 New York; ISBN 2-86294-020-8 Paris.) Price DM 48. In the UK the proceedings are available from Clive Bingley. It is regretted that this acknowledgement was inadvertently omitted previously.

J. LOVENACK
Editor
Aslib Biological Group

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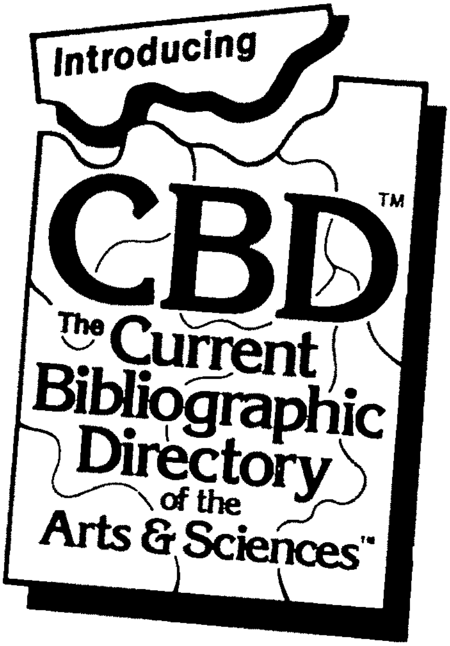
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Notes for contributors

Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, Kathleen Gray, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

A list of thesauri and subject headings held in the Aslib Library

Valerie Gilbert

Head of Library Services, Aslib

ASLIB LIBRARY HOLDS a collection of thesauri, subject headings and classification schemes which are used to answer members' enquiries about the existence of schemes for particular subject fields and many of which are available on loan for two weeks. Our policy is to acquire all significant English language publications and bilingual or multilingual items with English as one of the languages.

The following list covers subject headings and thesauri published since 1970. It is arranged in classified order based on the Universal Decimal Classification. A previous list[1] gives details of principal holdings prior to 1971 and an Aslib bibliography[2] contains references to thesauri and to material on thesaurus construction. Unpublished lists of classification schemes, pre-1970 thesauri and any foreign schemes held are available for reference in the Library.

The new British Standard guidelines for the establishment and development of monolingual thesauri (BS5723, 1979) recommends that the Aslib Library should be a clearing house for thesauri produced in the United Kingdom. Intending compilers should contact us to ascertain whether an existing or planned thesaurus covers the same or an overlapping field of knowledge, notify us of their intention to prepare a new thesaurus and deposit a copy of the finished publication in the Aslib Library.

We will be pleased to receive details of omissions from this list and welcome donations to our collection.

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Inside information: social welfare practitioners and their information needs

Bill Blake, Trevor Morkham and Alison Skinner

EISSWA Research Project, Wiltshire Library & Museum Service, Trowbridge, Wilts.

THIS ARTICLE sets out to chart, in a brief and therefore relatively condensed form, the development of the EISSWA Research Project since its inception in February 1977, and to outline its current position at the half-way stage in the programme. In the course of the article, some attempt is made to describe the 'action research' philosophy and method underpinning the project, these being in important respects different from the strategy generally adopted by more traditional research programmes. It is assumed that the article's principal audience will be those already working or researching in the field of social welfare information but it is hoped that the following comments will also be relevant to, and perhaps strike a familiar chord with, practising social workers and probation officers.

Background

Over the past few years, the British Library has funded a number of research projects in the social welfare field. Many of these projects have attempted to gain a greater understanding of the apparent lack of attention paid by social welfare practitioners to research findings and other published material relevant to their work. The problem seemed to be that this group (social workers, probation officers and so on) were largely unenthusiastic about reading 'professional' literature, for the most part rarely progressing beyond a passing familiarity with one or two of the main periodicals, for example *Social Work Today* or *Community Care*.[1] Even here, attempts at the dissemination of research findings or the promotion of new ideas in theory and practice had to compete with news items and job advertisements for the reader's attention, and the struggle at times appeared to be a somewhat less than equal one. Initially it was suggested that this might be associated with a lack of time and/or expertise on the part of the practitioners themselves, and that an abstracting service, covering the main social welfare publications, could engender in hard-pressed practitioners a greater awareness of current developments in their profession.[2] A number of county library services, notably those of Cheshire, Leicestershire and Wiltshire have been providing just such a service in recent years, and analysis of statistics relating to requests for photocopies suggests that it is a facility whose use is increasing over time.[3]

A parallel proposal by Smith and Webley, and other commentators,[4] would introduce a specialist information officer who would act as a link between the library-based service and its practitioner clients. Such a specialist would concern himself not just with published material, but with any resource information which might serve to assist and stimulate social welfare practitioners in the course of their work.

The British Library subsequently agreed to fund two projects focussing upon these issues. Project INNIS (information needs and information services in local authority social services departments), based at the Sheffield University Postgraduate School of Librarianship and Information Science, was the first to be established. By means of a programme of observation and interviews within several social services departments, INNIS aimed to identify the types and range of information required by social workers, how information is transferred between levels and between individuals within the organization, and the ways in which the departments might operate more effectively if access to appropriate sources of information was improved.[5]

EISSWA is the second of these related projects. Its conception owes much to the work of Maurice Line, Michael Brittain and others at Bath University during the early 70s, in particular those parts of the INFROSS and DISISS studies dealing with the information needs of social workers, which may be seen as the immediate precursors of the current research programme.[6]

What is EISSWA?

EISSWA (Experimental Information Services in two Social Welfare Agencies) is a three-year action research project funded by the British Library Research and Development Department.

Although the project is administered by the University of Bath, the research team is based at the Wiltshire Library and Museum Service Headquarters in Trowbridge, working in close co-operation with the service's existing information unit. The team consists of the project leader, whose background is in research and planning, including experience in social services, and two researchers, one of whom has trained as an information scientist whilst the other has a social work qualification and field experience as a probation officer. This mix of professional backgrounds is an important aspect of the research programme, enabling the team to adopt a multi-disciplinary approach which has already paid considerable dividends. Not least of these has been the advantage of having 'insider' knowledge of the professional groups—librarians, social workers and probation officers—with whom the researchers are working, and the relative ease with which the team has consequently been accepted within the three departments involved.

The aim of the research, as suggested by its title, has been to establish, monitor and evaluate a variety of experimental services designed specifically to meet the information needs of social workers and probation officers. Fundamental to the programme has been a policy of attempting to involve the practitioners themselves at all stages in the research process, from the initial identification of a particular information need, through the creation of systems and services intended to satisfy that need, to the evaluation and, if necessary, redesigning of those systems and services. The basic premise has been that practitioners will be more likely to use and—equally important—maintain information systems which they themselves asked for and helped to build than if those systems are imposed upon them from elsewhere.

The project's objectives can be regarded as having a two-dimensional quality. On the one hand the team is concerned to change the ways in which the social workers and probation officers with whom it is involved select, manage and utilize information in their day-to-day work. It is seeking to achieve this goal both directly—through the negotiation of 'contracts' with individual practitioners, teams and managers—and indirectly, building upon its relationship with the library service information unit to influence the kinds of services being offered. On a larger scale the team intends, during the course of the project, to circulate its ideas through both formal and informal channels to a wide range of individuals and groups in the social welfare and information fields. In addition to using the traditional avenues afforded by the distribution of a final report, and publication in academic and professional journals, the team plans to issue a regular series of 'action papers' describing particular aspects of the project's work. These will be generally available but will be circulated in the first instance to people with a special responsibility or interest in the area covered by the paper. Comments on the project's activities will be invited, the observations of these 'outsiders' constituting an additional source of data with which to evaluate the work and assess how far conclusions that may have proved reliable at a local level can also be credited with some degree of universal applicability. Thus the dissemination of the project's findings, which usually marks the culmination of an enterprise of this kind, should in EISSWA's case become an integral part of the research process.

At this stage it might be helpful to describe briefly a selection of the team's work with social workers and probation officers to illustrate the variety of problems encountered and the range of solutions presently being tested.

Information Exchange

Early in the project a group of community development officers from the social services department expressed the view that they rarely had adequate knowledge of new developments in other parts of the county and that this had significant consequences both in terms of the potential duplication of facilities and the department's capacity to plan its future services. The research team therefore undertook to produce a means of dealing with this problem. A large number of staff throughout the department were interviewed to elicit the information required. This was then collated, indexed and circulated throughout the department in the form of a bulletin, *Information Exchange*. Subsequently, a sample of recipients was interviewed in order to gauge attitudes to, and use of, the document. Initial impressions so far suggest that, whilst a large number of staff at all levels of the department have expressed support for *Information Exchange*, their actual use of the document in their day-to-day work has been limited. The research team is currently assessing whether this is a product of the layout and design of the document itself, or a feature inherent in any attempt of this kind to share information within an organization—or possibly a combination of both. It is intended that the assessment should be carried out collaboratively by the project and users; a group consisting of staff from various levels and locations in social services will examine and make recommendations on the data from the interviews and group discussions. It is anticipated that an approach of this kind will prompt a greater degree of organizational learning and user commitment to any subsequent solutions than would result from the researchers themselves making recommendations.

Technical college in-service course for residential workers

This is a one-year day release non-examination course established specifically for unqualified residential workers mainly employed by Wiltshire County Council. Because of their geographical dispersion, residential workers as a group tend to be isolated, both from each other and from the mainstream of the department which employs them. A link was therefore established with the 1977–78 course to serve as a line of communication between the residential staff and the project, and two researchers attended several sessions as participants and tutors, offering themselves as a specialist information resource to course members. The objective was two-fold: firstly to examine to what extent this practitioner group possessed special information needs which differed from those of social workers in general; and secondly to explore the potential for these needs being met by existing resources of the Library and Museum Service's information unit, in particular to make course members more aware of what the unit had to offer them.

It is planned to follow up course members in the near future to elicit their views on the service which was provided and to assess what impact the project was able to make upon their approach to their work. The insight gained from this exercise should enable the project to provide a service to next year's course members which is more successfully tailored to meet their information needs. In addition, the research team will be following up a sample of staff back at work in residential establishments, focussing principally upon their information needs in relation to the tasks which they regularly undertake and the problems which they periodically encounter.

Information flow within the agency

Repeatedly throughout the course of the project, probation officers and social workers have complained of being overwhelmed by the amount of information fed to them from colleagues, management and other agencies, yet at the same time they have been acutely aware of difficulties in obtaining relevant, and highly important, information when it is needed. This is in essence two problems in one, since the practitioner's chief concern may be with the content of the information—Why am I being told this? How should I respond? How do I cope with the knowledge that I may not be able to respond?—or with the management of the information—Where do I put this so that I can find it again when I need it? How long should I keep it? Frequently, of course, the anxiety of the practitioner combines the two elements, although it is possible that for most, their capacity to confront the problem of content may be determined by the extent to which they feel they have mastered the more basic task of managing their information.

In an effort to explore some of these issues, the research team has been operating within the Wiltshire social services and probation departments at a variety of levels, working with management, committees, teams and individual staff members. The project's approach, made explicit from the outset, has been to focus upon the information issues which are both real and important to its 'clients', and to collaborate with them in devising practical solutions which can be applied and modified on an experimental basis. The following examples, taken together, constitute a cross-section of the work on this particular subject and as such are fairly representative of the strategy which has been adopted and the solutions currently being tested.

(*a*) *'This is important—but who should I tell . . .? and how do I tell them?'*
Because of the hierarchical structure of both agencies, senior management and team leaders tend to become information 'gatekeepers' as much by default as by design. They receive a vast amount of unsolicited material from other agencies, from local and central government, and internally from within their own department, and they are often uncertain as to the most effective way of circulating and storing this data—effective in the sense of 'who needs to know about this?' The project has therefore undertaken to monitor and analyse existing flows of documented information in one social services area office, and to explore the possibility of storing the material centrally in the library service's information unit whilst enabling social workers to access the information which they need by means of a regular abstracting service.

(*b*) *'How do I apply for . . .?'*
The difficulty of organizing, updating and indexing procedural information has been a recurrent theme in discussions with agency staff. The project has recently completed a study of the procedure manual used in one social services area office, eliciting the views of social workers on the manual's shortcomings and inviting proposals for its modification. A group has been set up to produce a new experimental edition, with the research team participating on a consultative basis. It is intended to set up an evaluation of the new edition.

(*c*) *'What is the address of . . .?'*
One of the central features of the social work practitioner's role is the mobilization of agency and community-based resources for the benefit of the client. Fundamental to this task is the capacity of colleagues to share information amongst themselves and keep each other aware of changes or new developments as they occur. The project is consequently engaged with social services teams in establishing experimental 'low technology' systems—comprising simple display boards and back-up card indexes—designed to encourage team members to share information. Throughout the enterprise, the research team has sought to emphasize the importance of each individual social worker accepting responsibility for maintaining and evaluating the system, and has therefore discouraged as far as possible any tendency on the part of social workers to depend upon the researchers to perform these functions.

(*d*) *'Didn't we get something on that a few months ago?'*
In the probation service, a considerable amount of information relating to

technical, procedural or policy matters is disseminated by means of Home Office and internal staff memoranda. One particular probation officer expressed concern over the difficulty which he found in tracing information of this kind when he needed it. A member of the project team has been working with the officer in the development of a personal indexing system designed to cope with these documents. Subsequently, it may prove feasible to 'sell' the system to other interested colleagues and thus test out the possibility of a relatively unsophisticated retrieval system of this kind being adopted successfully by practitionets who have not been a party to its construction.

Training in the probation service

Through EISSWA's links with the Regional Staff Development Office (the central training body for the probation service in the South-West) the project has contracted to operate in a consultancy role with three probation teams in the area who are interested in investigating the access to, and use of, information in their day-to-day work, each team focussing upon a different aspect of the problem. One team's aim is to develop a shared system for storing and accessing information which comes into the team from a variety of sources; another has decided to look at ways in which more effective use of available and currently 'unavailable' information could help define and cope with the problem of unemployment in their area; whilst a third is considering how various types of information can help the team gain a clearer impression of the problems it faces and what resources it can call upon to tackle those problems. Despite the different orientation of the teams, it seems likely even at this early stage that all three will at some point have to answer certain key questions:

— Why do we want information? (What's wrong with relying upon hunch, guesswork, impressions?)
— Who is going to obtain the information? (Who's going to do the work?)
— How much information do we need? (When do we stop?)
— How do we apply the information? (What do we do with it when we've got it?)

Each contract is set to run for six months, at the end of which time it is hoped that both parties—the participant teams and the research team—will have acquired, at the very least, a much deeper understanding of the nature of the relationship between information and social work practice. An additional benefit, from the project's point of view, is that a great deal is being learned about the relationship of information work, training, and research, in particular from experiencing at first hand the advantages and disadvantages arising when the somewhat artificial boundaries which tend to exist between the three activities are deliberately blurred.

Finally, and perhaps most importantly, this work gives the project another opportunity to generalize about problems and solutions beyond its existing base.

Information services

The project's emphasis upon user commitment and participation has also encompassed the more traditional areas of enquiry work and selective dissemination of information. In the first year of operation, for example, over one hundred queries from probation officers and social workers were dealt with, ranging from requests for addresses or contacts, which could be provided in a matter of minutes, to questions which might necessitate several days of searching or which could develop into major long-term areas of work for the project. Similarly, the project has undertaken to provide a specialist SDI service for a number of senior management personnel in the social service department and it is envisaged that the recipients will in due course take part in an evaluation of the facility which, among other things, will consider its impact upon their work. Whilst these activities will obviously provide a rich source of data for the research programme, they are equally important as a means of developing points of entry into the participating agencies. In this way, important and deep-seated information needs which might otherwise not come to the surface can be uncovered and potential strategies for meeting those needs explored in collaboration with the practitioners themselves.

Whilst it is perhaps too early to put forward any definitive conclusions about EISSWA's activities, it is at least possible to identify certain major themes which may be important in attempting to provide information services to staff in social welfare agencies. There follow tentative formulations of a sample of these themes.

It's not what you do, it's the way . . .

Many of the project's experimental activities to date have resulted in innovations and developments which are apparently both simple and obvious; for example, sets of indexed cards on local resources, basic display boards for team information, and so on. However, the major point, stressed throughout this account, is that the process by which these services and systems have been introduced has been as important as the results of the various activities, so that generating commitment to use and maintain the services on the part of the beneficiaries is regarded as being crucial to the success of the research programme as a whole. The basic proposition is that seemingly sophisticated and 'efficient' solutions may not of themselves resolve the practitioner's information problems. What matters is that the introduction and provision of support functions such as information services leads people to change existing ways of working—a prospect which, it has long been recognized in social work and behavioural science fields, is often threatening and unwelcome. As in aspects of the social work task, involving the client in identifying and making explicit the problem is a vital prerequisite in any search for ways of resolving that problem, as is an acceptance that there may in fact be no solution.

Efficiency and effectiveness

'Duplication is wasteful'; 'Surely there are more efficient methods'; 'Let's rationalize the journal circulation': Information services and systems in an era of rapidly developing technology often concentrate on solutions which are perceived by the provider to be technically efficient. In the culture of social welfare agencies, notwithstanding current fashions for quantification and computerization, problems are often solved by low technology, pragmatic strategies. In these circumstances improvements in handling and use of information may derive from methods which are effective but relatively inefficient—a major criteria of 'effectiveness' being the degree to which the practitioner perceives the proposed solution as being workable. This is not an anti-technology, twentieth-century Luddite stance, but a recognition that it is necessary to operate at a level congruent with the needs of the customer. One can obviously choose to operate and be 'successful' on other levels, but only by tacitly ignoring the question 'whose needs are we meeting?'

A hierarchy of needs

Much of the previous research into the information problems facing social welfare practitioners has concentrated for a variety of reasons on the topic of reading and professional updating. Whilst EISSWA recognizes this as an important area of concern, the practitioners with whom the project has been involved generally regard this as being of lower priority than the more pressing problems of getting, organizing and sharing basic 'tools for the job' information: names of voluntary organizations, telephone numbers of GPs and health visitors, sources of financial assistance, and the like. The research team accepts this as an area of proper concern for any effective information function in these agencies—and it may indeed be vital to find workable solutions to these 'lower level' problems before moving up the 'hierarchy of needs' to issues connected with reading and professional updating.

What business are we in?

One particular concern of the project to date has been to explore the boundaries of research, training, administration, and information services. The aim has been to identify common areas of concern between these functions and to set up collaborative activities where the 'businesses' overlap. As an illustration, if one person needs to know more about 'granny bashing', reading an article may be effective; if ten or twenty people demand such an article perhaps a training seminar is a more effective means of meeting the need. Therefore close connections between an information unit and training sections may be essential if the various services are to most effectively meet customer needs. As a further offshoot of this the project is attempting to explore the concept of 'effectiveness' in information work. Much of the research literature concentrates upon statistics on use, non-use, and 'top-of-the-pops' ranking of journals, but how often are the objectives of information services made explicit and scrutinized? . . . perhaps less frequently than those of the social work practitioner.

A week in social work is a long time

Change is a fundamental component of the social work world—clients come and go, cases are opened, closed, and made 'pending'. Abstracting services aim to provide a regular, reliable service; the obvious gap is that a social worker's needs may not be synchronized with service provision. The EISSWA project is exploring how, and if, it is possible to build information-seeking into the primary decision-making units of social work: social work/client level; staff supervision level; team meeting level. The basic proposition is that unless such seeking is 'internalized' within the organization much information provision may be of the nature of 'throw a lot of mud and some will stick!' From this, it is hoped to make some ground rules for establishing and maintaining a 'presence' within social work agencies which should be useful to the 'how to do it' aspect of setting up information services in this arena.

As stated at the start of this section, these represent some thoughts towards a set of conclusions. In common with forthcoming documents from the project, the research team see this article as both a communication to interested parties in social welfare and library fields, and an open invitation to comment. The ultimate aspiration is to involve EISSWA's extended audience in a dialogue which will be productive for the project, its immediate clientele, and all those involved in information work with social welfare agencies.

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Locally produced current awareness services

J. E. Rowley

City of Birmingham Polytechnic, Department of Librarianship

Based on a paper delivered at a meeting of the SCONUL Information Services Group, Birkbeck College, 22nd January 1979

THE VALUE OF current awareness services has long been recognized, and the possible forms of such tools are well documented.[1,2] However, little attempt has been made to study the role and exploitation of these techniques in libraries and information units. Questions such as: which current awareness services are most popular?, is the most appropriate dissemination method dependent on the sector of librarianship?, how significant a part of a libary's activities are current awareness services? and, how do they fit into the day-to-day routine of the library?, remain unanswered.

The SCONUL report of a conference on information services in university libraries[3] contains the results of a survey which tackles the description of current awareness tools in university libraries, whilst another[4] studies some special library information bulletins. But, current awareness services have a function which is relevant to all libraries and information units. This study aims to describe, and make some comparisons among, current awareness services in all types of library. It does not attempt to present detailed management data, but explores practice across a large number of libraries.

The survey

A single A4-sized sheet questionnaire, accompanied by a covering letter and a self-addressed envelope, was mailed to 809 libraries and information units.

The questionnaire was kept very brief in order to elicit a good response rate. One side of the questionnaire sought to ascertain a little about the library, whilst the other asked for details of current awareness services. Each library was asked to specify: the organization within which its information service operated; the subject coverage of the library; and the size of its current periodical title acquisitions. The latter figure is a reasonably meaningful, although imperfect, indicator of the volume of current information passing into the library. Those libraries with a larger volume of current information have a potentially larger reservoir of information that might be announced through current awareness services.

Libraries and information units were asked to list the current awareness services that they produced locally, and give concise details relating to each of the following features of the service: main subject coverage; staff time expended

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per week; indexing language used; feedback mechanism; frequency; number of copies per issue; whether computerized. These features are both valuable in defining the nature of the current awareness activity and are likely to be readily available to the librarian or information officer. In order to clarify the term 'current awareness services' the following services were listed on the questionnaire: patents bulletin, events bulletin, abstracts bulletin, current contents service, SDI, press cuttings bulletin, accessions list, reports list, titles bulletin. This list is not exhaustive, nor are the descriptors mutually exclusive, but it embraces the more common descriptors encountered in this context.

The questionnaire was relatively tightly structured to facilitate comparison among libraries whose practices might be very dissimilar. Nevertheless, most libraries completed the questionnaire satisfactorily. The questionnaire, and other aspects of the survey design were tested in a pilot study in 1976. Sixty-four completed questionnaires were returned in the pilot study, and the feasibility of the main study established.

The questionnaire for the main study was mailed to 809 libraries listed in the Aslib *Membership List*. Although this list is biased towards libraries exhibiting some commitment to information activities, it does include libraries and information units from all sectors of librarianship. A postal questionnaire was viewed as the cheapest means of gathering information to draw a general picture of current awareness services. Other methods might be more appropriate to a more detailed analysis of specific cases or specific aspects of current awareness services. 471 replies were received, with 441 giving useful information, a response rate of 57 per cent. Although this group of responses can not be regarded as statistically representative, it forms a sufficient basis to draw some interesting descriptions. The number of responses from libraries of the various types can be gleaned from the last row of Table 1.

The details presented by the respondents have been summarized. After drawing some comparisons between the information units in different organizations, the more unique features of the dissemination methods exploited by the various types of libraries are examined in turn.

Current periodical subscriptions

A useful initial comparative measure might be the relative number of current periodical titles received, as shown in Table 1. A larger current periodical stock implies a larger amount of current information available for exploitation, and might lead one to expectations of a more generous provision of current awareness services.

With a few exceptions, a very high percentage of the libraries had acquisitions of below one thousand titles, and many of those were under five hundred. Only in the university library group, the public library group and to a lesser extent, the group of government libraries were there many libraries with larger periodical acquisitions.

Other comparative measures

Other interesting comparative measures are shown in Tables 2 and 3. Plainly these measures are only indicative, because, at the very least, the definition of a

	UNIVERSITY		POLYTECHNIC		TECHNICAL COLLEGE		OTHER COLLEGE		PUBLIC LIBRARIES		INDUSTRIAL LIBRARIES		CONSULTANCY		PROFESSIONAL INSTITUTES		RESEARCH ASSOCIATIONS		GOVERNMENT LIBRARIES		OTHERS	
		%		%		%		%		%		%		%		%		%		%		%
0–500	*11	23	1	8	13	81	11	65	44	72	130	88	13	100	11	73	29	78	26	59	28	88
500–1000	6	14	0	0	3	19	6	35	11	18	15	10			3	20	8	22	10	23	3	9
1000–1500	3	6	3	25					3	5	1	1			1	6			4	9		
1500–2000	4	9	2	17					1	2	1	1							2	5		
2000–2500	5	11	3	25					2	3									1	2		
2500+	†18	42	3	25															1	2	1	3
TOTAL	47		12		16		17		61		147		13		15		37		44		32	

* Ten of these eleven were special institutes within universities.

† Some universities cited acquisitions well in excess of 2,500, *e.g.* 9,000, 7,800, 4,500.

TABLE 1: *Size by numbers of current periodical titles*

	UNIVERSITY LIBRARIES	POLYTECHNIC LIBRARIES	TECHNICAL COLLEGE LIBRARIES	OTHER COLLEGE LIBRARIES	PUBLIC LIBRARIES	INDUSTRIAL LIBRARIES	CONSULTANCY	PROFESSIONAL INSTITUTES LIBRARIES	RESEARCH ASSOCIATIONS LIBRARIES	GOVERNMENT LIBRARIES	OTHERS
% NO SERVICES	19	17	44	18	28	15	23	27	11	16	16
TOTAL NUMBER OF SERVICES OFFERED (S)	55	13	15	24	91	314	22	13	74	98	62
(S/N)	1.2	1.1	0 9	1.4	1.5	2.1	1.7	0 9	2.0	2.2	1.9
% ACCESSIONS LIST ONLY AND NO SERVICES	49	33	62	63	38	18	23	53	16	36	28

N = Number of libraries in a group

TABLE 2: *Some indicative measures of current awareness activity*

	UNIVERSITY LIBRARIES		PUBLIC LIBRARIES		INDUSTRIAL LIBRARIES		RESEARCH ASSOCIATION LIBRARIES		GOVERNMENT LIBRARIES	
		%		%		%		%		%
1– 3 hrs	2	8	2	6	1	1	1	3	1	3
1– 3 hrs	7	28	5	15	10	10			6	20
3– 5 hrs	6	24	4	12	7	7	1	3	2	7
5–10 hrs	3	12	6	18	17	17	6	21	5	17
10–15 hrs	3	12	5	15	15	15	1	3	2	7
15–20 hrs	2	8			7	7	3	10	4	13
20–30 hrs	2	8	3	9	18	18	4	14	4	13
30–40 hrs			5	15	10	10	3	10	1	3
40+ hrs			4	12	19	19	10	34	5	17

TABLE 3. *Total time spent on current awareness services per man week*

/current awareness service may vary from one library to another. Each separate service cited has been counted; combined services, where, for instance, an abstracts bulletin, a press cuttings bulletin, and an accessions list are issued in one publication are counted together as one service. A series of, for instance, four abstracts bulletins, in different subject areas, is regarded as four services. The amount of effort channelled into a service and the number of users it serves, amongst other things, will vary among services. Hence the measures in Tables 2 and 3 must be interpreted with care. Nevertheless they summarize in different ways the magnitude of the current awareness activity in the various sectors. The percentages for 'no services' are comparable; only technical colleges have an exceptionally high percentage with no services. However, when those libraries offering accessions lists only are grouped with those offering no services discrepancies become more apparent. (Accessions lists are a very basic form of current awareness service, which are usually a by-product of housekeeping routines.) Technical and other college libraries have a high level of inactivity, followed by professional institute and university libraries. Public libraries, polytechnic and government libraries are moderately ambitious, whilst industrial and research association libraries exhibit the highest level of activity.

The pattern is broadly similar when the number of services, that is, the magnitude of the activity (as opposed to inactivity), is examined. Professional institute and technical college libraries, followed closely by university and polytechnic libraries, are relatively uncommitted. Industrial, research association and government libraries produce more services per library.

Table 3 turns to the man hours expended each week on current awareness provision locally. Figures are shown for those libraries which were able to provide them, in the larger groups of libraries. Table 3 summarizes the extent of the effort directed towards dissemination services. Where times in excess of forty hours a week were quoted, for example, in industrial, public, research association and government libraries, this may amount to as much as 120 man hours per week. In these sectors a few libraries were devoting considerable time to their current awareness programme. At the other extreme, Table 3 shows that it is possible to operate a current awareness programme which absorbs very few resources.

University libraries

University libraries do not operate as ambitious a programme of current awareness services as the size of their current periodical acquisitions might warrant. There was a heavy dependence on accessions lists, and most of these were not products of an information team, but emanated from the technical services group. Accessions lists either related to the entire stock of the library, or were selective on a subject basis. Three accessions lists were distributed in under ten copies, but most accessions lists were printed in a few hundred copies, and made widely available. Several university libraries remarked that they relied on a system of liaison officers or subject specialists working on a personal basis with departments to provide satisfactory information services. This system was more formalized in nine libraries who mentioned operating a manual SDI service. Such service usually amounted to chance items being dispatched to members of staff. Other libraries were circulating external, commercially available SDI services to academic staff.

Concerning feedback mechanisms, most university libraries left this column blank, as if the concept was totally alien to them. Even libraries running current contents services stated that they had no feedback mechanism. The impact of mechanization was limited to assistance in the production of a newsletter, five accessions lists, an annual bibliography, and in the use of the products of external mechanized SDI services.

Polytechnic libraries

The number of periodical titles in polytechnic libraries is lower than that in the university libraries surveyed, but still larger than most of the other libraries. The range of services offered in polytechnics showed more imagination than in university libraries; some polytechnics could boast a relatively extensive programme, but others felt constrained by time and resources. One polytechnic librarian remarked: 'I have no time for such services as all staff time is devoted to keeping the library doors open, keeping the bookshelves in order, and maintaining effective basic library services such as book reservation and interloans service'.

Some libraries produced accessions lists, some compiled on a site basis, others on a subject basis covering, for example: art, law, transport, accountancy. Current contents services were produced by one library in education and astronomy. Another library generated current contents/accessions lists in several subject areas. Some libraries bought and circulated tools such as Bradford University's *Articles in Civil Engineering*, Aston University's *Higher Education: A Current Awareness Bulletin*, *Herts Information Review: Further and Higher Education*. SDI was used by purchasing UKCIS or INSPEC services for specific departments, or by providing informal SDI via library staff. Abstracts bulletins in education were produced by two libraries, and a press cuttings bulletin in science and technology by another library. 'Subject lists' or 'information bulletins' which took on a variety of guises, were produced by subject specialists in two

	UNIVERSITY	POLYTECHNIC	TECHNICAL COLLEGE	OTHER COLLEGE	PUBLIC LIBRARIES	INDUSTRIAL LIBRARIES	CONSULTANCY	PROFESSIONAL INSTITUTE	RESEARCH ASSOCIATIONS	GOVERNMENT LIBRARIES	OTHERS	TOTAL
Patents bulletin	0	0	0	0	0	27	1		4	1	0	33
Events bulletin	1	0	2	0	8	28	2	1	2	6	5	55
Abstracts bulletin	1	2	0	1	28 (21)	43	0	2	14	10	10	111
Current contents	16	2	0	5	4 (2)	15	4		4	15	6	71
SDI	9	2	3	1	11 (3)	35	2	1	13	13	12	102
Press cuttings bulletin	0	1	0	3	11 (6)	32	4		5	8	6	70
Other press cuttings						3	1			3	2	9
Accessions lists	24	4	9	12	2 (2)	59	4	3	17	29	16	197
Reports list					2 (1)	27	3	1	5	8	5	51
Titles list	2	0	0	2	6 (1)	18	1	1	5	4	3	42
Others	2	2	1	0	1	27	0	5	5	1	7	51

TABLE 4: *Types of service offered by various types of library*

libraries. One library valued its weekly new book displays as 'economic and effective'.

With only two exceptions, all who produced services recognized the merits of some feedback mechanism. The most popular mechanism was loan requests, but three services also distributed an annual questionnaire.

Technical college libraries

The size of technical college libraries and the nature of their audience leads to an expectation of relatively limited current awareness programmes. Overall this was certainly the case, but the tools that featured were interestingly varied (see Table 4). One library engaged in periodical circulation, whilst another library preferred to index periodical articles and include them in the library catalogue. One library felt that 'current awareness is maintained through informal contacts whereby library staff will pass on information to the Principal, heads of departments and other staff, where relevant. This is feasible in a compact single site building. Use is made of approximately twenty-three sq. m. of notice boards.'

None of the libraries explicitly mentioned any type of feedback mechanism.

Other colleges

Under this heading are grouped colleges of further education, colleges of higher education, colleges of technology, colleges of education, a pilot training school and an art college. In common with technical colleges the range of services being offered by any one library was not particularly ambitious, but most libraries were providing some sort of service. Of the five libraries running current contents services, three were general, one was in education and another library ran services in English and human movement studies. Another library bought and circulated current awareness services in higher education. One or two of the libraries had relatively extensive current awareness programmes. For example, one library ran an abstracts bulletin, current contents, SDI, press cutting bulletin and accessions list, all in education, whilst a further library operated a press cuttings bulletin, current contents, accessions list and a titles bulletin. One library claimed to run a mechanized current awareness service. Feedback mechanisms were recognized to be valuable, although eleven of the fifteen services with feedback relied upon 'informal channels'.

Public libraries

Most public libraries (73 per cent) have a stock of current periodicals of under five hundred titles, and a further 18 per cent have 500 to 1,000 titles. In recent years some public libraries have started to exploit their stock more actively and public libraries now run an imaginative range of current awareness services. These can be grouped into three main categories: events bulletins, local government officers services and the remainder.

Bulletins covering topics of interest to local government officers might take any form; the column of figures in brackets in Table 4 shows the number of services of each type which were designed for local government officers. Many libraries engaged in the production of a formal bulletin and also participated in informal SDI; thus many SDI services were spin-offs and absorbed very little time. Abstracts bulletins were frequently the result of co-operative schemes, for example, the Yorkshire and District Local Government Information Service, and five public libraries in Northern Ireland. Involvement in a co-operative venture may mean that only a few hours of staff time are required. Other public libraries were directing considerable effort into the generation of a series of abstracts bulletins. Press cuttings bulletins tended to take less time to prepare (between three and ten hours); they were sometimes printed in only a few copies (in parallel to SDI) and in other instances in hundreds of copies. Press cuttings bulletins were normally a daily publication. Even those libraries who were not compiling their own current awareness services for local government officers were conscious of the need. Some libraries were distributing other information departments' bulletins, for example, *GLC Daily Intelligence Bulletin*, *LOGA*, *FOCUS*, *Urban Abstracts*. Two libraries who were not presently providing any service indicated their intention of organizing a local government information service when funding became available.

Local government service programmes might be very extensive. One library compiled seven bulletins covering the whole of local government, including architecture, education, planning, social services, highways, transport, libraries, management, finance *etc.*, which demanded the time of five staff. A further library offered a series of five abstracts bulletins, with accessions lists as supplements, and some SDI. Or, more simply, another library circulated a list of titles of selected books to Council members and senior officers.

Events bulletins covering local, art, entertainment and cultural information are unique to the public library. They are printed in large quantities of up to 15,000.

Other current awareness services for which public libraries are responsible are very varied. Some are on topics which would find an audience both amongst local government officers, and in other groups, for instance education and architecture.

Industrial libraries

Industrial libraries, not surprisingly, in most cases collected only a small current periodical stock (87 per cent had under 500 titles). But it is well known that this is one of the sectors of librarianship with which current awareness services are traditionally associated. In fact only twenty-two libraries had no current awareness services, and of these, nineteen had a total library and information staff of two or less. In many other industrial libraries and information units the time devoted to current awareness services was relatively high. Current awareness services are an expected component of the information department's activities, and the compilation of such services is well integrated into the procedures associated with the other activities of the library. One librarian, despite running an accessions list, a reports lists and journal circulation regretted the 'lack of staff, especially clerical, which had caused the lack of current awareness services'. Journal circulation was also cited by three other libraries.

Some libraries were benefiting from centrally produced bulletins, for instance, patents bulletins from central patents departments or press cuttings bulletins from the company publicity department. Others were responsible for input to centrally produced services—events bulletins, accessions lists, and titles bulletins.

Many bulletins generated by industrial libraries were combinations of the various forms, and a series of publications might be issued in a number of subject areas. For example, one library issued bulletins on each of: commercial, household products, toiletries, packaging, and regulatory affairs. Each of these bulletins contained an abstracts bulletin, an events bulletin and an accessions list. Items on some topics (such as management) may appear in more than one bulletin.

A topic of special interest with regard to industrial libraries is mechanized information services. Mechanization is almost negligible in other groups, and even in industrial libraries its penetration is limited. Only twenty-one libraries (14 per cent) mentioned using mechanized current awareness services.. Some libraries had mechanized the entire range of their current awareness services, as far as is reasonable, but others were only enlisting the aid of the computer for a limited number of their services. Typically, press cuttings bulletins and events bulletins remained manual. Many of the mechanized systems were generating an SDI service, but this was frequently part of a wider programme. Some libraries were profiting from programme packages, such as ASSASSIN and SLIMPAC, whilst others preferred to operate and design their own systems. The information processed might be limited to locally scanned items, or might rely on the products of UKCIS, BIOSIS, IFIS, *etc.*

A fuller account of the details of the types of services offered by industrial libraries is to be found in a forthcoming article.[5,6]

Consultancy libraries

Despite their limited size most of these libraries were proffering some current awareness services. Many assorted types of service were represented, save those which demanded a lot of time, like abstracts bulletins. All services took ten hours or less to produce. Most services were printed in only a few copies, since the clientele of the library is frequently very small. As one librarian remarked: 'The firm is very small (around thirty people) and so most current awareness is done on an informal, personal basis, with the librarian aiming at keeping closely in touch with individual's areas of interest'.

Research association libraries

Research associations vary widely in their commitment to current awareness services. Some merely serve the research workers of the association, whilst others produce services which are marketed much more widely. Abstracts bulletins, in particular, may be issued in editions of over 1,000 copies.

Some mechanization was encountered, especially where the library participated in a co-operative information data bank venture. Feedback is mainly via requests (in thirty of the forty services with feedback). In many other respects this group has much in common with the industrial library group.

Professional institute libraries

Professional institutes, as one librarian commented, 'have a specialist subject area, but a very large number of potential users. This makes current awareness services extremely difficult to use effectively.' In this sector the library's current awareness services were often a feature in the institute journal, and were constrained by this form of presentation. Two libraries placed selective lists of accessions and periodical articles in members' journals, another three placed an accessions list in the journal, and another placed abstracts bulletins, reports lists and titles bulletins in the parent organization's journal. Because of the nature of their publication, these tools tended to enjoy a large circulation, for example 75,000, 14,000, 30,000.

Government libraries

Both the size and specialist subjects of these libraries were very disparate. Subjects included population and medical statistics, sport and physical recreation, tourism, architecture, computing, public administration, ecology, *etc.*

The current awareness programmes were agreeably comprehensive, with SDI, current contents and accessions lists being especially significant. Some libraries were dedicating as much as 105 or 120 man hours per week to the compilation of an abstracts bulletin, but other services claimed very little time. Most of the estimates for accessions lists, reports lists, SDI and press cuttings services fell below twenty hours per week. A sizeable number of services (thirteen of seventy-seven) were issued in over 1,000 copies; these were mostly abstracts bulletins and accessions lists, but also included a titles bulletin, a current contents service, a patents bulletin and an SDI service.

No services were mechanized, although one institution had started trials. Some libraries depended upon computer generated external services such as SDI. Requests for loans was the main feedback mechanism, and was much more likely to be present than in some other environments (fifty-two of the sixty-five citing a feedback mechanism). It is interesting to note that the implementation of SDI and SDI evaluation forms has enhanced feed back in general.

Other libraries

This category includes libraries and information units associated with nationalized industry, local government, research institutes and research establishments, trade associations and registered charities. Thus it is not a very homogeneous group. The services encountered in this group are broadly similar to those of many other groups; abstracts bulletins, SDI and accessions lists are relatively popular. Local government information units tend to concentrate on local government oriented services, similar to those offered by some public libraries.

Conclusion

The survey reveals some current awareness activity in all sectors of librarianship. Nevertheless, in academic libraries activity is relatively limited, in keeping with the traditional do-it-yourself approach expected of users in these libraries. Such activity as is evident in academic libraries is still all too frequently restricted to an accessions list. Public libraries have developed their current awareness programmes immensely in recent years, especially in the field of local government information services. Special libraries vary in the nature and extent of their provision, but remain the main proponents of current awareness services.

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Bradford's law and libraries: present applications—potential promise

M. Carl Drott, Jacqueline C. Mancall and Belver C. Griffith

Graduate School of Library Science, Drexel University, Philadelphia, USA

Bradford's Law is presented as an observation made from the outcome of searching, rather than a mathematical development. The organization and presentation of search data is explained. Potential applications of Bradford's Law are discussed. New findings are presented which show the relationship described by Bradford's Law to be fundamentally important but in a more subtle way than previously supposed. Future developments are suggested in terms of their impact on librarianship.

BRADFORD'S LAW IS based upon an observation which anyone who does literature searches can make. Namely, if one searches the journal literature for articles on any specific topic, a particular pattern will emerge. The pattern is that a fairly large number of the articles will be concentrated in a few journal titles while there will be a large number of journals which contribute only one or two articles each. This can be visualized more clearly by considering some data.

Organizing data

As part of another research project we performed a search on a specialized topic in medicine. Or more properly, the search was performed for us on the Medline computer system. Upon sorting out the results of the search we found that 277 articles had been retrieved and that these represented ninety-seven journal titles. Looking more closely, we found that the largest number of articles contributed by a single title was thirty-seven. On the other hand there were fifty-six journals contributing only one article each. In order to portray this more clearly we created Table 1. Ranks were assigned to the journals so that the journal contributing the most articles was ranked number one; the journal with the next greatest number of articles was ranked number two; and so on. We have recorded this in Table 1 where each line represents a specific journal. In the first column we enter the rank, and in the second we record the number of articles contributed. Thus, looking at only the first two columns, we see that the first journal contributed thirty-seven articles while the next journal (rank two) contributed twenty-five. Scanning down the table, one can see that the number of articles contributed by each successive journal drops very quickly. On reaching the bottom of the table you will see that we have abbreviated the table to save printing space. The fifteen journals which were ranked twenty-seventh through forty-first contributed two articles each. These are reported in

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condensed form in the table, as are the journals ranked forty-second through ninety-seventh which contributed only one article each.

In order to see what is happening more clearly, we add a third column headed 'cumulative articles' which reports a running total for the articles retrieved. On the first line are the thirty-seven articles retrieved by the first ranked journal. The sixty-two on the second line is the total number of articles from the first two journals (thirty-seven from the first plus twenty-five from the second). Similarly the first three journals contributed a total of seventy-six articles. This continues on down the table. When we get to our fifteen journals tied at two articles each, we must remember to add thirty (that is fifteen times two) to the total.

JOURNAL RANK	ARTICLES FROM JOURNAL	CUMULATIVE ARTICLES	CUMULATIVE PERCENTAGE OF ARTICLES
1	37	37	13%
2	25	62	22
3	14	76	27
4	12	89	32
5	12	101	36
6	8	109	39
7	7	116	41
8	6	122	44
9	6	128	46
10	5	133	48
11	5	138	50
12	5	143	52
13	5	148	53
14	4	152	55
15	4	156	56
16	4	160	58
17	4	164	59
18	3	167	60
19	3	170	61
20	3	173	62
21	3	176	63
22	3	179	64
23	3	182	65
24	3	185	66
25	3	188	67
26	3	191	68
27 thru 41	2 (15 × 2)	221	80
42 thru 97	1 (56 × 1)	277	100

TABLE 1: *The results of a search in terms of articles per journal*

The first three columns contain all of the information which we need to describe the distribution of articles over journals. However, to make the discussion of the data easier we add a fourth column. The fourth column presents the cumulative percentage of articles retrieved. It is created by dividing each number in the third column by the total number of articles (in this case 277) and multiplying by 100 to give a percentage. We have rounded off these percentages since the extra precision would not give us any additional information.

Scanning down the fourth column we can now observe that with only the first three journal titles we could supply over one quarter (27 per cent) of all of the retrieved articles. Similarly twelve journals would suffice to supply over half (fifty-two per cent) of our articles. This approach can be used by a library to identify important journal titles or to select items for weeding.

A statement of Bradford's Law

The pattern of the dispersion of articles over journals which we have just discussed is interesting but hardly up to the status of a law. The discovery which gave us a law was first published by S. C. Bradford[1] and it is this:

> It is possible to take all of the numbers representing cumulative number of articles retrieved (column three of the table) and to express them in a single mathematical formula

This is a rather strong claim.

Consider all of the events represented by our search. An author decided to write an article; he selected a journal; the journal published it; the National Library of Medicine chose to index the journal; an indexer assigned terms; the same terms were selected for our search; and, finally, the document was retrieved. Yet the claim is made that, as far as the distribution of articles over journal titles is concerned, the outcome of this process is predictable.

This is the formula:

$R(n) = h \, . \log n/s$ (B. C. Brookes[2])

This formula is for predicting the cumulative number of articles retrieved (column three of the table). In the formula, n is the rank for which we wish to predict, and $R(n)$ is the corresponding cumulative number of articles.

That is to say n and $R(n)$ correspond to the first and third columns of the table. By selecting any rank, one can use the formula to calculate an estimate for the corresponding cumulative frequency. For example, given a rank of five we would hope to calculate a value of cumulative frequency close to the actual number of articles, 101, which appears in the table. In the formula the variables h and s are constants—different for each search. In this case we have calculated the value of h to be 140 and s to be one.

Suppose we want to predict the cumulative number of articles contained in the first five journals. Using tables, we look up the log of five (the rank) and find .70. (Note that since s is equal to one it has no effect on this calculation.) Multiplying by our constant of 140 gives ninety-eight as our prediction. The table gives us the actual number, 101. The formula was a bit low, but very close by the standards applied to laws in the social and behavioural sciences.

Comparison of observation and prediction

In order to see how well Bradford's Law predicts the outcome of our search

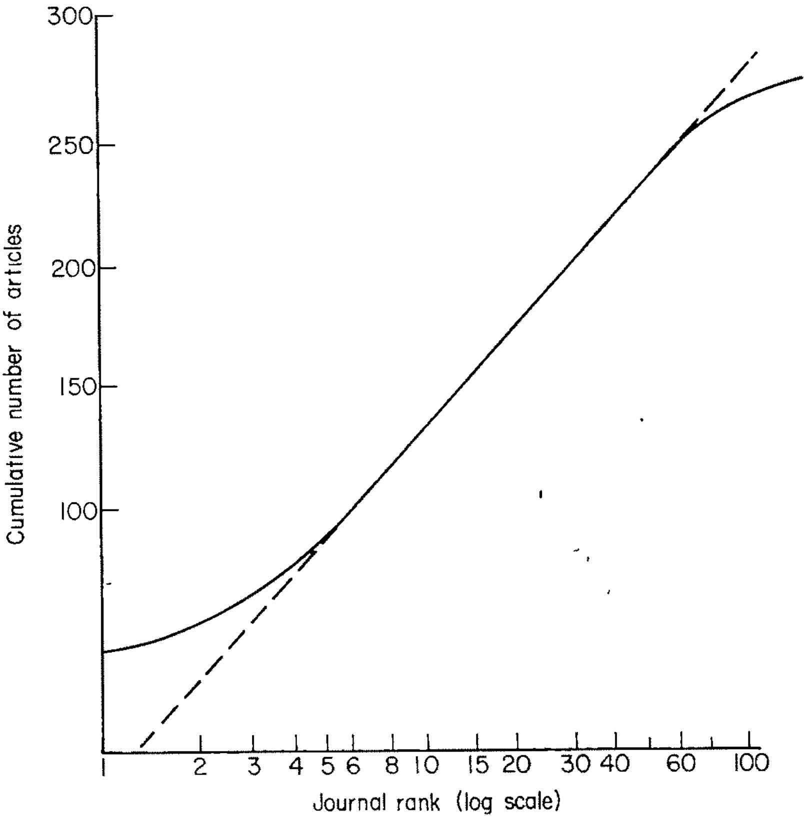

FIG. 1. *Predicted and observed values of a search*

we need to compare the predicted cumulative number of articles with the actual results of our search. One way of doing this is to draw a graph which shows both the predicted and observed values. Figure 1 is such a graph for the data which was presented earlier. The solid curve shows this data. Every row of the table becomes a point on the graph. On the horizontal axis we have log rank and on the vertical axis the cumulative number of articles. To plot an observed point we first look up the log of the rank, find this on the horizontal axis, and go straight up from this point until we are opposite the appropriate value of cumulative articles on the vertical axis. Doing this for every journal gives us the solid curve shown in the graph. (Note that because of the small size of the graph we have not tried to show each of the points.)

On the same graph we can plot a line (the dashed line in Figure 1) representing the values of cumulative number of articles predicted by Bradford's Law. Because of the nature of the formula the predicted values will always form a straight line. In many of the studies reported in the literature this line is not calculated but is simply drawn by inspection. That is, the best prediction that

Bradford's Law would give can be shown by the straight line that most closely fits the curve. This can be done because the two constants in the Bradford's Law equation correspond to two properties of a straight line. The constant *b* reflects the slope of the line. A high value of *b* would result in a line which is closer to vertical, while a lower value would be more nearly horizontal. The constant *s* is a measure of where the line hits the horizontal axis. Low values of *s* mean that the line comes close to the point at which the axes meet.

An alternative way of drawing the line representing Bradford's Law is to determine the values of *b* and *s*. These can be calculated using the observed results of the search. The technique is called linear regression and formulas for it appear in many textbooks on statistics. (In the vocabulary of statistics cumulative number of articles would be called the independent variable while the log of the rank would be the dependent variable.) The calculations involved can be made with a pocket calculator. Many computer installations have pre-written programs which will do these calculations. For example, we used a package of programs called Statistical Package for the Social Sciences (SPSS). Given values for *b* and *s*, Bradford's Law can be used to calculate a predicted number of cumulative articles for each rank. These can then be plotted on the graph. Again, the points would all fall on the (dashed) straight line—the line of predicted values.

We can now look at the line and the curve on the graph and see how they compare with each other. If our predictions were perfect the two would be one on top of the other. The pattern which we see in this graph is very typical. In the first place the prediction is quite good, particularly in the middle part of the graph. At the lower part of the graph (the part that was drawn using the journals ranked one, two, three, *etc.*) we see that the prediction and the observation do not agree. The law is predicting that the first ranked journals should have more articles than they actually do. (The fact that the graph presents cumulative number of articles makes this finding hard to see. To be completely accurate one should say that the first journal contributes many more articles than estimated while the remaining top ranked journals each contribute fewer than the formula would call for.) Investigators have explained this as a 'saturation' of the journals. That is, for any particular topic the most important journals tend to limit the number of articles they will accept (or in the case of a journal devoted solely to a particular topic the limit is the number of pages in the journal). It is generally accepted that the equation representing Bradford's Law does not hold for the most important journals. This exception is minor in overall terms and tends to apply only to the first four or five journal titles.

We see from the graph that there is also a failure of Bradford's Law to predict the upper end of the observed data. The law predicts that more articles will be found than are actually located. (This has been called the 'Groos Droop' after the person who first reported it.[3]) The exact cause of this inconsistency is not completely understood. Some authors have suggested that it could be an indication of an incomplete search—that is the law is right but the searcher has not been sufficiently diligent. Another point of view is that the search is incomplete but that all actual searches must be incomplete. A third point of view holds that the present formulation of the law is wrong because it includes the physical impossibility of a journal which contains a fraction of an article. In any case, the effect of this error on the accuracy of the prediction is minor.

Potential application

The question to which we now turn is how Bradford's Law can have an impact on librarianship. There are two immediate applications of Bradford's Law which have been suggested. The first is to check on how well a search was done by comparing actual with predicted retrieval. The second application is the prediction of the outcome of a search before the search is done. The ability to do either or both of these things would be very significant and there have been reports in the literature suggesting that both might be possible. The necessary feature for such a suggestion to be valid is that the two constants in our equation (*b* and *s*) are reflections of the nature of the search topic and of how well the search was done. If this is true, then by observing the value of the constants, we can rate the quality of the search, or by estimating the constants, we can predict the outcome of a search.

Here is how one could use the value of *b* to evaluate a search. First the search is performed and the value of *b* is calculated. This could then be used to predict the cumulative number of articles which would have been found in a complete search. Hence, we would have a theoretical standard against which we could compare an actual search.

In a similar manner if we could use our knowledge of the breadth of a particular subject and the thoroughness with which we intended to conduct a search we might predict *b* and *s* in advance. Thus we could predict the outcome of a search before the search was done. Such an ability would have great potential for acquisition planning and collection evaluation.

Some recent findings

In order to find out more about how to predict the parameters of Bradford's Law we examined the outcomes of twenty-three different searches. Some of these were searches presented in the literature while others were done specifically for our study. The full results of this research are reported elsewhere.[4,5] However, because those reports are heavily based on mathematical analysis and statistical argument, we will reiterate the major points here.

Our sample collection of twenty-three searches represented a wide diversity of subject matter and search technique. Topics included several areas of medicine, two specialities in physics, social science topics, tropical agriculture, and marine biology. Some of our searches were compiled from a single abstracting and indexing service while others involved complete bibliographic searches. A variety of time spans were represented including the same topic searched over several years. The size of the retrieved sets varied from about three hundred articles in one hundred journals to more than eight thousand articles in seven hundred journals. This set of searches provided a rich environment in which to examine Bradford's Law with respect to different subject matters and search techniques.

Our first step was to use a computer to calculate *s* and *b* for each search and to test how well the predictions of Bradford's Law matched the actual search results. All of the searches showed a very good agreement with Bradford's Law. In fact, in every case Bradford's Law explained better than ninety-two per cent of the variation in the cumulative number of articles. (In statistical terms, the correlations exceeded .96.) We take this to be a strong confirmation that the outcome of searches does follow Bradford's Law.

The next step was to look for patterns of topic and search techniques that would let us predict the values of *b* and *s* rather than calculate them from the completed search. We also tried to explain how closely the data fit the theoretical law in terms of the quality of the search. In both of these attempts we were unable to find any relationships which would help us to predict the values of *b* and *s*.

The failure to find a method of predicting *b* and *s* does not mean that none exists. A more detailed study of the data might reveal subtle patterns or regularities. However, we believe there is a more straightforward explanation of the situation revealed by our data.

In the course of our analysis we found that there was a strong relationship between the value of *s* and the ***total number of journal titles retrieved.*** There was a very strong relationship between *b* and the ***total number of articles retrieved.*** (The correlations were .82 and .99 respectively.) Both of these relationships are much stronger than one would expect from the obvious fact that the number of journals and the number of articles are related to each other. (The correlation of total journals to total articles is .59.) If fact, these relationships are so strong that there is in a sense 'no room' left for search technique or topic to have an effect.

Our findings argue that all searches which produce the same total number of articles will have about the same value of *b*. All searches which produce the same number of journal titles will have similar values of *s*. This relationship will hold regardless of the breadth or narrowness of the topic, the subject matter, the time period covered or the manner in which the search is done. The only possible restriction may be that the search be of some reasonable level of quality or extent.

Perhaps our argument can best be illustrated with a parable. Suppose that two information scientists were to stage a contest the point of which was to predict the shape of the Bradford curve to be formed by the outcome of some particular search. A searcher performs the search and calculates the curve. The two researchers are allowed to ask questions in order to gather data on which to make their predictions. Let us suppose that the first researcher is allowed to ask only two questions: How many journal titles did you find? How many articles did you find? The second researcher may ask as many questions as he wishes about the nature of the subject matter being searched, the breadth of the questions, or the manner in which the search was conducted. The results of our study lead us to believe that the first information scientist, the one who knows nothing of the subject matter and has only two figures describing the output, will win. He will succeed in more accurately predicting the shape of the curve. This victory is a necessary consequence of the high correlations found in our results.

These findings cast doubt on the hypothesized applications of Bradford's

Law which were discussed above. The librarian who wishes to apply quantitative management techniques to the problems of the dispersion of articles over journals is left with a little insight and a great deal of reliance on judgment. The most useful tool in such a situation is a table such as our Table 1. From this, one can guess in a rather exact way the likely effect of limiting a search to only a small group of the most likely journals. One can see how changing the number of journals examined would change the overall potential of the search. Similarly the table can be used to help estimate the impact of dropping (or adding) subscriptions to relatively obscure journals. In both cases the selection of appropriate journal titles must depend heavily on professional judgment.

If Bradford's Law does not reflect the nature of specific searches we must consider what its potential value may be. First of all we should reiterate that Bradford's Law, in so far as it is a mathematical formula which describes, in general, the outcome of searches, is enormously accurate. The same pattern occurs again and again. Clearly, there must be some very basic reasons for this. Not only do we have Bradford's Law, we have similar observations from related fields. Zipf's Law describes the occurrence of words. Words (in any particular language) can be ranked in order of their frequency of occurrence. When rank is plotted against frequency of occurrence the pattern is mathematically identical to Bradford's Law. Similarly, if authors are ranked by the number of papers each of them has written, the pattern (called Lotka's Law) is of the same type. Other aspects of human behaviour also give rise to this kind of pattern.

Recent papers by B. C. Brookes[6] and Derek de Solla Price[7] have attempted to cast further light on Bradford's Law viewed as the manifestation of a fundamental underlying mathematical regularity. The discovery of regular mathematical patterns has been of great importance in both the physical and social sciences. For example, events as disparate as the outcomes of games of chance and the distribution of educational test scores give rise to a particular pattern. When graphed, this pattern forms a bell-shaped curve. (Today this bell-shaped curve is familiar in its widespread use by teachers in determining grades from test scores.) This curve is called the Normal Distribution.

The Normal Distribution forms the basis for a large part of modern statistics. If one is measuring some activity or phenomenon which follows a Normal Distribution, then one can make very precise statements about the accuracy of the observation or about the similarity (or dissimilarity) of different sets of data. This is done through the use of a set of mathematical tables which are calculated from the equations describing the Normal Distribution. A researcher simply looks in the appropriate table, applies a correction based on his particular situation, and is at once able to make some very definite statements about the results of his experiment.

We are, of course, not yet to this point with respect to the Bradford Distribution. Much theoretical work remains to be done. While we cannot see all possible impacts, we can suggest a simple situation in which such developments can be of use. Suppose that a librarian wishes to sample a collection in order to find out how much use is made of various materials. An important question is how accurately such a sample would portray actual use. Put another way, one might ask what sample size is needed to obtain some desired accuracy. Preliminary work shows that in such a case the required sample size (for a given degree of accuracy) is much larger than the sample size that would be required if the Normal Distribution was applicable.[8] This means that researchers using current statistical practices would drastically over-estimate the accuracy of their results.

Conclusions

Bradford's Law is at once both a pervasive and an elusive phenomenon. At one time the ease with which the use pattern which Bradford's Law describes was detected, and the discovery of its mathematical regularity led investigators to hope that it could be easily applied to the quantitative solution of library problems. The discovery that this law describes an underlying probabilistic phenomenon rather than more superficial characteristics of the data casts doubt upon proposed applications. The exact importance of Bradford's Law remains to be determined. It does, however, seem that there is great potential for future impact on a wide variety of information related situations.

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Reflections on the utilization of the Universal Decimal Classification

Richard Hindson

Hindson & Partners, Chairman, BSI
Technical Committee DOS/3 UDC

UNTIL RECENTLY the writer participated actively in the application and development of the Universal Decimal Classification, principally by means of computer-based techniques available via large ICL 1900 series installations. During the decade 1968–1978 a multi-purpose database was developed and operated using remote computer resources equipped with extensive telecommunication facilities.[1] Primarily designed to support senior managers, the subject coverage of the system encompasses all matters judged to be useful in the particular business environment concerned. One feature of the system is the use of the UDC for both information (reference) retrieval and profile matching.[2] It is hoped that some personal reflections arising from the experience gained and on associated matters will be useful to those involved in the management of information in large organizations.

The catalogue approach to information

In the days when information science was regarded as a rather curious and even temporary phenomenon the aspiring librarian learned by precept and possibly experience that people requiring documents containing information tended to frame their requests using one or more of the following:

1. authors
2. subjects
3. physical characteristics.

Few people, or so it seemed, considered the publisher, a record number (ISBNs being a recent innovation), or some other trifle as being relevant to the retrieval of any required document unless it was a patent specification, a British Standard or possibly a 'DIN thing'. Thus librarians concentrated on bibliographical descriptions and detailed catalogues constructed according to ever more elaborate codes or rules. The catalogues were and indeed still are tripartite, consisting of:

(a) an author index
(b) a classified array
(c) an alphabetical subject index to the classified array.

The physical characteristics of documents, except obvious ones such as format or size, tended to be ignored unless the number of items was enough to form a special collection. Librarians were torn between constructing the perfect catalogue and economy. Catalogue formats proliferated although card catalogues

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predominated. Those of us who were familiar with the banks of card cabinets found in the larger industrial libraries of twenty-five years ago are not likely to forget them. Nevertheless it could be said that tradition and commonsense directed the skills of librarians towards a particular objective—the classification and supply of required documents containing fact, fiction or philosophy. This was in accordance with the doctrine 'the right book to the right reader at the right time'.

The catalogue was regarded as the key to any collection of documents. Not much consideration was given to the fact that most readers apparently preferred to ignore the catalogue. The availability of experienced staff with retentive memories tended to conceal any shortcomings in the 'catalogue approach'. Change in such a situation is, of course, inevitable. Unfortunately change at too rapid a rate is revolution, and revolution destroys what individuals cannot or do not wish to understand. In retrospect this is what seems to have happened to the basic philosophy underlying the unifying 'library catalogue' approach to document and information retrieval. In particular the protagonists supporting keywords and thesauri (*i.e.* alphabetical subject indexing) ignored the close and subtle relationship which natural language indexing has with the classified approach. This is not to say that some supporters of the classified approach did not do the same. The need for extensive alphabetical indexes to classification schedules was dismissed by some on the grounds that knowledge of the schedules showing the classified array was enough. Consultation of many of the fascicules of various British editions of the Universal Decimal Classification will demonstrate where that approach led. The fact is that the one cannot be a substitute for the other. The classificatory or systematic approach and the alphabetical indexing approach are complimentary and are both essential to the efficient information operation. Nor is either a substitute for human evaluation and judgment. No system, computer based or otherwise, can replace human expertise in the field of information retrieval and evaluation. Any system is a support for the human mind.

Modern techniques

Given the storage and processing capabilities of modern large computers, information managers working in mission orientated organizations can create immensely powerful support systems. Each system will call for a database consisting of a sequential file of unit records of items containing information judged to be useful to the managers and specialists of the parent organization together with inverted files and/or the facilities for making such files. Modern techniques make the creation of such files a relatively simple matter. Such an approach will overcome various difficulties experienced in the past and build a more powerful tool than is economically possible using the traditional catalogue approach.

The basic layout for the unit records included in the database must provide for all the access points to information likely to be needed by enquirers currently and in the future. Apart from the usual bibliographical details—source, publisher, ISBN and so on it is also necessary to include such details as conference paper number, translation number, research report or thesis number—some published papers are versions of originals which are also available—and other details common in the environment in which the database is to operate. Clearly it is also necessary to provide for the inclusion of the details of the physical formats—written, sound and visual—of the units containing the information. The unit records can also contain somewhat ephemeral data concerning the status—secret, confidential, open—and the availability—on loan, lost, reference only—of any document or other item.

It is often necessary to fill out the details concerning authors. For example an author's work is often important to an enquirer because at the time of authorship the individual was working for a given organization in a particular place. Hence the need to include the author's affiliation in the record. Certainly within a large organization it is often necessary to be able to provide details of documents arising from a particular part of the organization. Taken to its logical conclusion this can provide the means for management control of an organization's output of internal documents and (external) publications. It should be noted that the author's organizational/geographical location is not necessarily the same as the geographical location of his or her topic, which may be a plant or process elsewhere. Nevertheless, depending on the needs of enquirers, both an author's affiliation and the geographical location of the topic can constitute access points.

Retrieval schemes

Careful consideration must be given by any information manager as to what constitutes a subject for information dissemination and retrieval purposes within a particular organization. Traditionally subjects for these purposes have been those encompassed by the academic approach—perhaps because most large collections of literature even today are associated with academic organizations and activities. Hence the requirements of people drawing on these collections have had an overwhelming influence on subject identification and the necessary guides, *i.e.* classification schemes and thesauri. However, managers and staff working in business (industrial and commercial), government and semi-government organizations have requirements which enlarge the traditional approach. They tend to approach information retrieval via their organization's technology and the applications which are currently important. Another important approach is via the names of organizations, products, places and individuals. Sometimes one wonders whether or not an expanded 'Cutter number' dictionary of proper names might not be useful and economical. Frequently the proper name approach is further complicated by a time dimension which is marked by events familiar to the enquirers and their colleagues. Thus the unit record must provide access via proper names which may well include the accepted names for key events.

Clearly, it is essential to provide for the traditional subject approach in unit records. The issue about which the information manager must make decisions is 'How is it to be done?'. KWIC and KWOC indexes are relatively easy to create. Unfortunately, titles being what they are, a great deal of editing by automatic stop lists and human judgment is necessary as well as enrichment by the addition of words and phrases. Clearly any major activity of this kind leads in the direction of keyword indexing and thesaurus construction. Provision for use of an extensive thesaurus will considerably enlarge the unit record and its utilization may well be extravagant in computer time. Sometimes space and time is saved by using numbers or a mixed notation to represent the keywords. If one proceeds along this path then the issue becomes 'Should a classification scheme with a notation be used to assist the retrieval of relevant records in response to enquiries?'. Numerous factors must be considered by the information manager in coming to a decision. In essence these add up to an answer to another question—'What will it cost to implement the subject indexing mechanism?'.

The larger the unit record and the more extensive the range and depth of all indexing the greater will be the need for accuracy and consistency. The greater this need the more resources will be required—both machine and human—for system specification design and implementation. The utilization of resources must be balanced against the expected benefits, but it must be accepted that while it is possible to strive for perfection it is unlikely to be achieved. The information manager must not only take into account the resources which are likely to be available but also the social and psychological factors present in the parent organization.

The anticipated ultimate size of the database must also be considered together with the range and complexity of the material collected. A database of 10,000-plus unit records giving access to a collection of material concerned with all aspects of a mission-orientated organization will benefit from the use of a classification scheme. By the use of such a scheme considerable space can be saved in the unit record itself. Quite complicated relationships are usually inherent in any classification scheme and the basic philosophy can take account of this. Indeed a scheme especially designed for a particular application will have required relationships built into it. Unfortunately any specially designed scheme tends to become an energy sink as more and more work is required to keep it up to date as time passes.

Using the UDC

However, the information manager can decide to use a general classification. Prominent amongst these is the Universal Decimal Classification which is 'the most widely used system for classifying and indexing books, documents, or articles in any field of knowledge'. The UDC is a truly international system. It is widely used in the USSR, and for some years, 'in the many European countries of the Socialist camp', the UDC was the only obligatory system of classification for technical and scientific literature;[3] other systems were optional. In recent years the use of the UDC has spread in South America and it is also used in Japan. It is of course widely used in Europe and Scandinavia. At the international level the FID sponsors the linking committees and indeed owns the copyright.

Although the UDC presents to the uninformed and inexperienced an apparently old-fashioned or even Procrustean appearance, it is in fact a very usable classification the notation of which lends itself to computer processing. It can be used for on-line information retrieval and profile matching in information dissemination. The technical obstacles which it was thought would prevent the use of UDC in such systems have proved to be largely illusory. The major obstacles which are hindering the satisfactory further development and application of the UDC are those associated with its management. It is likely that these will be overcome, albeit slowly, particularly, with regard to the English language editions. Therefore information managers can take comfort in the fact that with all its imperfections the UDC can be utilized beneficially in any computer-based information dissemination and retrieval system. It is also true that information managers do not have to accept the UDC as it stands without being able to influence its improvement and development through national and international committees. In the United Kingdom the committees are managed by the British Standards Institution. By means of these committees British information specialists can work together to improve and update the English language editions of the UDC. It is unfortunate that many of the current imperfections of the UDC continue to exist because, in the past, many users did not participate in this work. Also it is regrettable that up to now the most powerful influence in library work in the United Kingdom today—the British Library—has not put its full weight behind the BSI's fulltime and voluntary activities in the UDC sphere. Of course the British Library may well be influenced by the criticism of the UDC which has appeared in the literature over the years. However, much of this criticism is illfounded simply because no thorough investigations have been undertaken into how the UDC has been utilized in traditional catalogue and machine-based systems in the UK. Indeed the overall UDC scene in the UK is characterized by a lack of hard fact and empirical evidence. At the present time, for example, there is no published up-to-date record of which organizations use UDC for what purposes. The British Library would perform a useful service if it supported a programme of work in co-operation with the British Standards Institutions' fulltime and voluntary UDC activities beginning with a market survey type project.

In the absence of a full market survey report on the utilization of the UDC, information managers must undertake their own retrieval of relevant information. One of the most useful guides to the literature concerning computer applications utilizing the UDC is *Computers and the UDC*.[4] This review was prepared by Malcolm Rigby and published by the International Federation for Documentation. Personal contact with considerable numbers of existing users of the UDC can be established via the officers of the British Standards Institution. Basic knowledge of the UDC can be gained through Aslib courses and A. G. Brown's programmed text.[5]

Choosing the UDC

As outlined above information managers must give careful consideration to the information needs of the clientele to be supported by means of the database and thus identify the data to be included in the unit record. The identification of this data is possibly simpler than the design of the unit record itself where similar information can be noted in different guises in different fields of the record. In a computer-based system the relationships among the various fields of the unit record are far more fluid than those existing in traditional catalogues, indexes, printed bibliographies and so on. Character matching techniques enhance this fluidity. It is possible to search on an identifiable part of a UDC notation—say a form or country element—no matter what its position in the notation string. Also the sequence of the elements of the notation and thus the sequence of entries in any listing produced via on-line search can be determined while a particular search is being carried out. To a certain extent this reduces the need for slavish adherence to specific rules although basic classification and indexing theory must be understood. Clearly the availability of powerful techniques which allow these approaches forces information managers to consider very carefully the precise layout of the unit record and where and in what form necessary information is to be included. Each field of the record must support the other fields. For example enriched titles will enlarge the subject retrieval capability of the whole if the enrichment takes account of the current UDC schedules in the relevant area. This approach is vital to the successful operation of a database in any mission-orientated organization which undoubtedly will have an 'organizational' language of its own.

Factors of importance in the British environment must also be considered. For example the utilization of a document containing useful information often depends in the United Kingdom at least on whether or not it is available in English. This can be clearly indicated via the UDC notation but it should not be forgotten that most translations of papers and articles have a unique identification number. This is usually included in the bibliographic details. Since the identification usually indicates the source of the translations and as most translate into only one language this part of the bibliographical field of the record could be used to indicate language availability of translations and original documents. However, it is probable that it is more efficient to use the facilities of the UDC to indicate language availability particularly where this is significant in the material being collected.

The opportunities which arise of using the UDC to indicate significant factors in addition to traditional subjects are extensive in a computer-based system utilizing inverted indexes and character-matching techniques. The UDC is of course far more than a simple subject indexing scheme. It has many facilities which allow it to be used as a short-hand notation to further compress the unit record without losing information that is important. Indeed on occasion the UDC can be utilized in ways which will allow more accurate recording of data than is possible any other way. However the fatal mistake of believing that there is only one approach to information matching problems must be avoided. The UDC must be used in association with other approaches if it and they are to reach their full potential in a computer-based system. Information managers must accept this and design their data bases accordingly.

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BRIEF REVIEW

ANDERSON, I. G., *ed.* Current Asian & Australasian directories: a guide to directories published in or relating to all countries in Asia, Australasia & Oceania. Beckenham, Kent, C.B.D. Research, 1978. 264 pp. £27. (ISBN 900246 251.)

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Alexandria updated: the brief for the British Library building, Euston Road, London

David T. Rodger
The British Library

Based on a tape–slide presentation at an Aslib Evening Meeting, 21st February 1979

WHEN JOHN RUSKIN proposed that we 'find national amusement in reading rooms as well as rifle-grounds; give prizes for a fair shot at a fact, as well as for a leaden splash on a target,'[1] he was articulating that resounding faith of the Victorians in the peculiarly moral value of libraries for which the twentieth century, with its more diverse and systematic sources of information, can muster no exact parallel.

Perhaps for this reason the late twentieth century brings to the construction of a major national library not only more acute perceptions of the functions to be housed but also less dogmatic, and therefore more varied, ideas about the ultimate beneficiaries of these functions. I hope that we can explore these perceptions and ideas at the same time as I illuminate for you the process by which the British Library compiled and refined its brief for the architect of our scheme at Euston, Professor Colin St John Wilson. You will then be able to approach Professor Wilson's tape–slide presentation with something of the same sense of knowledgeable anticipation which the client experiences when he has presented his needs in the form of a brief and awaits a solution in the form of a building design.

The British Library building on Euston Road, next to St Pancras Station, is intended to re-house all the Library's services and staff in London with the exception of the Newspaper Library, which will remain at Colindale. The chief occupant of the new building will therefore be the Reference Division, consisting of the Department of Printed Books, the Science Reference Library, the Department of Oriental Manuscripts and Printed Books and the Department of Manuscripts. The Bibliographic Services Division will be another major occupier.

Justification

It is evident that belief in the need for a new building to house the Reference Division presupposes, among other things, a belief in the usefulness of national reference libraries in general. Although it is normal to speak piously of libraries we must remember T. S. Eliot's warning that 'men who meet only for definite serious purposes, and on official occasions, do not wholly meet . . . they will continue to retire from these encounters each to his private social world as well

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as to his solitary world.'[2] The understanding of reading, of research, of the consultation of sources which policy-makers, or commentators on policy, bring from their solitary worlds to their official occasions is bound to vary. One may expect to come across, for example, an unawareness of the methods of research in the humanities and of the consequent need for a library in which extended lines of enquiry can be pursued through hundreds or thousands of citations, often without prior knowledge of which books or periodical articles will in the event contribute most to the work. This kind of library use is far removed from Ruskin's 'fair shot at a fact', which could be understood to imply a short dash towards a mere handful of citations. It is also remote from Ruskin's concept of 'chosen books, the best in every kind,' which may be an admirable prescription for a certain species of open-access collection but suggests, quite unacceptably, that a library should contain only distillations of wisdom and knowledge and not the raw sources from which distillations are made.

From 'solitary worlds' to official occasions there may also be imported a sadly limited appreciation of older material and of publications in foreign languages. We must then reassert that the British Library is an international as well as a national library. I do not believe that the full argument needs to be restated to this professional audience. Nor do we need to elaborate in this circle on the role of a national reference library in the retention and transmission of knowledge and ideas. The consumers of a major reference library are also producers, part of the chain of synthesis and popularization which will bring to the less specialized reader a paperback or a newspaper article and to both readers and non-readers alike their television programmes, their films, and everything else, both in science and in the humanities, which can be channelled into daily living from printed, filmed and handwritten sources.

Although we may all agree that a research collection of wide scope is necessary and that it must be capable of access without delays occurring between every request, we may accept as legitimate some debate about how large a large collection needs to be, how it should be preserved and by what means continuous access should be achieved. To some of these topics I should like to return later.

The stimulus to provide a new building for what is now the British Library in London grew during the 1960s from the mounting difficulties of readers, who in that decade experienced for the first time those problems which have since become no more tolerable although more familiar. Lack of storage space in the British Museum led to the establishment of the Woolwich repository, while the newly founded National Reference Library of Science and Invention, now the Science Reference Library, faced an expanding role without an adequate home and was almost immediately divided between Holborn and Bayswater. In both of the Library's largest departments users suffered delays, either by having to wait for deliveries from Woolwich or by having to commute between buildings.

In the later 1960s reader seating in the British Museum also became insufficient and steps had to be taken, against all the best instincts of librarianship, to reduce the number of visits.

Throughout that period, and even more so in recent years, the preservation of the collections gave cause for concern. The argument for a properly conditioned environment for the books and manuscripts was unanswerable, given the known effects of pollution, fluctuating temperature and unsuitable relative humidity on paper and bindings.

As subsidiary motivation one could also mention the various symptoms of malaise which afflict any library in outdated premises: the fragmentation of staff, the separation of staff from collections nominally in their care and the impossibility of installing modern mechanical aids. In the background, as further encouragement to move, loomed the accommodation problem of the British Museum itself.

History

The history of the site for the new British Library building is closely entwined with the process by which the British Library came into being and severed its administrative links with the British Museum. As long ago as 1964 the architects Sir Leslie Martin and Colin St John Wilson had produced their outline design for a new library building opposite the British Museum. The metamorphosis of that design to incorporate the enlarged aims of the British Library has been illustrated in the *Architectural Review*[3] and the culminating stages of a debate about the appropriateness of that first site have been documented by publications of the London Borough of Camden[4] and the British Library Board.[5] It suffices to say that in 1975 the government announced a change of site, to a 9½ acre plot of land on Euston Road, which offered the advantage of having no residential occupiers.

In the history of the client's brief we can disregard the activities of 1962–64 and start our account from 1970. In that year the library departments of the British Museum, including what we now know as the Science Reference Library, produced a brief for the re-housing of the constituent parts of the British Library's present Reference Division.

In 1972 this brief was revised to reflect the proposed structure of the British Library and, therefore, to include the Bibliographic Services Division (or the British National Bibliography Limited, as it then was). The revised version was christened *the final brief* to distinguish it from the 1970 text, which was called *the preliminary brief*.

The preliminary and final briefs were intentionally written with a minimum of reference to the proposed site. This was providential because it meant that the move to Euston did not in itself require a completely fresh start. The opportunity was taken to restore some of the cuts which restrictions of the Bloomsbury site had imposed and space was added for the Research and Development Department and the Central Administration. Certain unfulfilled expectations of the British Library Organizing Committee were quietly dropped. Needless to say, the architect had to find a new design solution to our requirements. But he did not have to wait while a new brief was written and this mitigated the effects of the change.

Requirements

The general intention of the brief has been to meet the needs of the library and its users in London as they will be in the year 2000 as well as to provide scope for future adaptation.

The required storage capacity was calculated on the dual assumption that compact shelving would reduce the area needed for a given run of material while annual acquisitions would increase with world publishing output. No specific reliance was placed on microfilming to reduce the storage needs during *this* century, but the working party recorded its belief, on which the complete success of the scheme indeed rests, that modern technology would extend the storage life of the building long beyond the unacceptably early year in which it would theoretically be full.

Making microforms and acquiring microforms are already major pre-occupations of the British Library. At the Newspaper Library significant space is saved. Elsewhere economies of space are expected from programmes which have gained their initial impetus either from the pressing needs of conservation or from orders placed by users and other libraries. Indeed, the co-ordination of these three needs—space-saving, conservation and customers' orders—challenges us to re-examine and optimize a considerable number of operations. Since architecture is our theme this is not the place to elaborate on the opportunities for both conflict and mutual benefit which can arise between, let us say, the immediate, random needs of remote users and the long-term, systematic intentions of a conservation microfilming scheme, but it is important to make known that the challenge is being met and the Library is expecting to increase its present total of fifty-eight cameras as well as to maximize their potential.

The extent of open access raised fundamental questions in 1970 and again in 1972. It was successfully argued that the Science Reference Library should offer primarily an open-access collection, the winning arguments being the urgency of commercial, technical and patents use, the needs of a current awareness service and the demonstrable fact that short visits, such as are common in the Science Reference Library, are particularly vulnerable to frustration through the slightest delay.

In the other departments, especially the Department of Printed Books, a considerable extension of open access is planned, but not on the same scale. The radically different approaches in the two large departments have had important consequences for the architect's design.

Another decision by the Library, which was important for the architect, concerned the size and function of reading areas. We felt from the beginning that service counters should serve fewer readers than sit in the round reading room in the British Museum building. Experience had suggested that a smaller ratio of readers to counter enhances relations between the servers and the served. On the other hand, the ratio of staff to readers must be kept economic. From these considerations there emerged a target number of 250 seats per reading area. The published designs show how the architect pursued this aim while attending to his own problem of providing a sense of space without waste or ostentation.

It is interesting to note, in parentheses, that the new Staatsbibliothek in Berlin houses all its readers in one huge space while concurring with the need to disperse its service counters.[6] It is doubtful whether the particular solution adopted in Berlin would now find favour with fire officers, but the extreme ease with which the visitor can find his way around that building indicates a pre-occupation with intelligibility which is also evident in Professor Wilson's design.

We further addressed ourselves to the question of how many specialist reading rooms should be planned. In the Department of Printed Books there was a strong conviction that readers should be as free as security permits to read any book in any room. This conviction was not so widespread, or should I say so dogmatic, as to break down the establishment of different reading rooms for the various departments or to deny specialist areas to maps, music, rare books and philately, but it did prevent the over-proliferation of self-contained mini-libraries in the brief and discouraged over-specific assumptions about the roles of the various reading spaces. It should be added that nothing in the design solution would prevent a future administration from providing more specialized services, but it is more difficult to reverse the effects of planning for highly differentiated use, and in so far as this danger arises from our brief we are keenly aware of it and constantly striving to minimize it.

Clearly, in the Science Reference Library, the presence of open-access shelving as a dominant feature of the reading areas did call for thoughtful solutions to the location and density of the readers' places.

Digressing for a moment from the readers to the general public, we note that exhibition galleries take up 2,500 square metres in the brief and in the final design. There are compelling reasons why exhibitions should be part of the Library's work. Entire branches of art history and of the history of applied art and graphic design are in the domains of the two departments which contain manuscripts and the three departments which hold printed material. Both permanent and temporary exhibition spaces are needed if the wealth of visual material is to be brought adequately to the eyes of the public. We also believe very strongly that exhibitions are the means of explaining and, we hope, endearing ourselves to a wider public than our readers, however widely we may hope to define our readership in the future. We may demur nowadays at Ruskin's choice of words—I would not, for example, describe our objective as 'the loftier . . . privilege of bringing the power and charm of art within the reach of the humble and the poor'—but however we phrase our sentiments we can recognize that libraries do have a function in the dissemination and the affirmation of historic values which goes beyond the production of plain facts.

Providing for the future

Providing for traditional tasks while providing amply for the tasks of the future is a sharp test of a library's judgment. The planner must assume change, not only change which will challenge his powers of forecasting, but also change which will ease his burden. Mobile shelving, air-conditioning, mechanical handling and electronic data transmission were all available, from the start of our project, as potential solutions to problems. To take a minor example, the mere decision to adopt electronic transmission of readers' requests to the stacks rather than pneumatic tubes simplified the work of the services consultants, opened up new operational possibilities for the Library and, on the debit side, exposed the future service a little more to the fallibility of advanced technology.

At the time of the feasibility study the use of microforms was recognized as a facility which must in the long term be allowed for on a large scale. Almost every seat will be capable of being so equipped. Later in the planning, but fortunately not too late, the needs of ADP, which had already been recognized in the offices, were recognized also in the reading rooms. The provision now planned would allow, if fully installed, not only the consultation of catalogues on-line and the ordering of books and photocopies on-line, but also the consultation of databases on a very extensive scale. The provision for data-base consultation presupposes, of course, a symbiotic relationship between on-line bibliographies or abstracting services and the printed or microfilmed word. By supposing this we part company, of course, with visionaries who tell us that in the world of the future all information will be on-line. The withering away of libraries, like the withering away of the state, has often been adumbrated, but the last trump and the date of its sounding are as uncertain for the one as for the other.

Nevertheless, planning for ADP is difficult terrain. Readers who belong to large organizations might choose to perform their on-line searches in their universities or offices before proceeding to the library. Some slight financial advantage, some administrative ruling, could be enough to affect people's behaviour in this respect. When we guess the outcome we have to remember that every item of heat-producing equipment adds to the cooling load of the air-conditioning system in a sealed building. The argument then shifts to predictions of the future heat-producing performance of ADP equipment. One might want to question the specification for the environmental conditions themselves. I shall not go through the whole cycle of arguments and hypotheses, but you will have gathered that a cluster of interlocking decisions, all affecting expenditure, is involved. The planner must try to keep a quantifying grip on all the arguments. If he does not, the unquantifying pruners and arbitrators will hold their festival: percentages will be trimmed off with no clear view of the consequences. For this reason it is always better to have a quantified view of the future, even if it is proved wrong. No view means no money.

Methodology

We have spent some time on the decisions which had to precede the construction of a detailed brief and at this point we may note the great advantage of having an architect already appointed and ready to give advice while the client is mulling over his strategy. This contrasts with the device of preparing a brief for an architectural competition. In that case the client may innocently and unnecessarily constrain the architect by his brief and the architect may be tempted to win the competition with bold gestures which will later constrain the client. All this we were fortunate to avoid.

From feasibility study and basic philosophy we moved on to an organization and methods analysis of the Library's work. This was an essential step in a changing library and especially in departments such as those housed in the British Museum building where the structure itself had left a deep impression on the actual procedures. From this analysis there emerged a much clearer view of the spatial relationships which were necessary and those which were merely desirable. Enquiry desks and printed catalogues have perhaps over the years caused us particular concern in this respect. The reader's approach through the building, his need for guidance and his later need for more specialized advice demand proposals from the library to the architect. But the librarian must beware of making proposals on the basis of a preconceived notion of the plan of the building.

The next step after the listing and examination of functions and their interrelations is to forecast their growth within the global limits already laid down by the feasibility study. When we had accomplished this we set about drafting the spatial brief. This was done room by room, or rather, functional space by functional space, for we agreed with the architect to ask for a defintion of needs rather than to allow the specification of separate rooms directly. We also agreed that areas were to be justified by a painstaking summation of all the items of furniture and equipment necessary for the execution of the work concerned.

As might be expected, the first listing of furniture and spaces exposed inconsistencies as well as giving an entirely beneficial freedom to make all wishes known. The architect's next step was to negotiate with the Library a standard list of furniture and work-stations which properly reflected furniture dimensions current in libraries and in the public service. This list was then coded for computer input. When the final brief was compiled these codes were used on computer input forms to permit an automatic calculation of net areas and to perform other tasks such as, for example, substituting the minimum standard space allocation for a member of staff where the furniture list had not provided at least this by means of the program used. The same computer input form was used for later amendment—usually of a space-saving nature—and this saved both much clerical labour and the risk of confusion and error.

In obtaining the net areas of functional spaces as I have described, we not only imposed a discipline but also avoided sample layouts of rooms as the vehicle for space calculations. We have trained ourselves never to submit our own sample layouts to the architect and we have very consciously seen this as part of the clear separation of roles which is vital if client and design team are to do their respective jobs properly. Conveying this outlook to new members of the Library's planning team is always the most cogent reminder of the fact that there is an art, or a science, in being a good client.

At this point I should make it clear that the client for the British Library project at Euston is the Department of the Environment, or, to be absolutely specific, the Directorate of Civil Accommodation in the Property Services Agency (PSA). PSA exercises control over the programme and efficiency of the project by means of its contractual relationship with the design team and through a committee structure which embraces the other interested government departments and the Library. In this structure, as elsewhere in the project, the various interests and areas of expertise are scrupulously respected and within this disciplined organization the Library enjoys direct access to the architect on all matters to which librarians' advice is relevant.

My own role in this complex relationship is to ensure that the advice of librarians is punctual, consistent and in conformity with agreed policy. In every department of the British Library in London there is at least one Planning Officer responsible for that department's brief and there are other Planning Officers with library-wide responsibilities for various technical requirements such as data-processing and conservation. I myself draw attention to any matters which seem to require deliberation by the Board, consultation with the Advisory Council or communication to the staff. By this organization we have, I believe, created an ability to respond with alacrity to requests from the architect and PSA. We have also provided for proper consultation while avoiding the dangers of planning by committee, a procedure which is certainly widespread but very open to abuse. A horrifying, though possibly prejudiced, account of one such exercise is given in *Studio International*'s tale of the planning of the Pompidou Centre.[7] Even if that article were pure myth it would eloquently express the worst fears which planning by committee evokes.

I have tried to give you some insight into both the broad strategy and the minutiae of an enterprise of this size. No short account can offer a substitute for such authoritative and exhaustive works as have been written by Godfrey Thompson,[8] Michael Brawne[9] and Keyes Metcalf.[10] I would merely hope to signal to you that building a very large and particular library is recognizably the same sort of undertaking as building any other library, but with additional problems which always to some degree put it in a class of its own.

The British Library project at Euston has now reached the stage where work has started on the site and completion of Stage 1A can be predicted for 1991 if the existing timetable is adhered to. As the work proceeds there are, of course, many matters of detail still to be finally resolved in the internal design, some of them with financial implications. I have mentioned a number of those arising from air-conditioning, and such was also the conundrum of reconciling the safety of the collections with the requirements of the fire authorities—both vital concerns, without which our Library might well experience the sad end as well as the illustrious heyday of its predecessor at Alexandria.

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Survey of in-house user education in special libraries

Catherine Sullivan

Aslib Research Department

ONE OF THE most noticeable characteristics of the burgeoning literature of user education is the very heavy emphasis on activities in the higher and further education sectors; universities, polytechnics and colleges have been revealed as the centres of user education activity in the UK, the USA, and elsewhere, and the user education programmes of many of these institutions have been discussed in detail in the library journals. Extensive reviews of the issues involved are contained in the articles of Scrivener[1] and Stevenson,[2] whilst the most comprehensive bibliographical study of user education (both internationally, and for those inside and outside of the formal educational system) is that provided by Taylor, Harris and Clark.[3] By contrast, however, the provision of user education in special libraries has received very little attention, with the result that the British Library's Review Committee on Education for Information Use concluded in 1977:

> 'It is from the education of practitioners—managers, General Practitioners, social workers, farmers, etc.—that one might expect the most immediate results in terms of benefits obtained by applying information. However, the Committee has been unable to find much evidence of any systematic user education activity in information units in industrial or research organizations, although it must be stated that only a handful of organizations were canvassed.... The Committee therefore recommends that the British Library Research and Development Department should commission a survey of user education practices in special library and information units.'[4]

The resulting survey is reported briefly here, and indicates a level of activity in user education perhaps somewhat above the expectations of the Review Committee.

Since so much of the developmental work in user education has been completed in the universities and polytechnics, it is difficult to extrapolate the conclusions of this activity to the special library community; a certain homogeneity of audience exists in the higher education sectors (with the necessary *caveat* here that a considerable range of library and information needs and uses has been identified amongst students at all levels) which permits the development of generalized programmes of user education, but such homogeneity cannot be assumed amongst those persons who make up the real and potential clienteles of special library and information services. The mere range of host organizations which may be subsumed under this heading is an indicator of the variety of demands which are likely to be made upon such services. Accordingly, it becomes vitally important to begin any systematization of user education within these services by investigating the range of present user education activities and the governing influences on the level and extent of this provision.

Aslib Proceedings, 31 (7), July 1979, p. 322–333. Printed in Great Britain

Basis of the study

Questionnaires were sent to a total of 1,437 special libraries, drawn from the Aslib *Membership List* 1974/75, the Library Association *Membership List* 1975/76, and the *Aslib Directory*, third edition, where addresses could be updated. The questionnaires were addressed to the 'chief' librarian or information officer in each case. 698 usable completed questionnaires were returned, a response rate of 48.6 per cent, distributed as shown in Table 1.

After analysis of the returned questionnaires, thirty of the respondents were selected for interview on the basis of amount of user education given (ranging from four who gave no instruction to eight of the most active in this area). The interviews were intended to provide greater insight than is possible with a postal questionnaire, and to illuminate attitudes towards provision of instruction. Interview results are used from time to time to clarify or comment on findings from the questionnaire survey. The distribution of respondents in terms of size, expressed by various measures, is shown in Tables 2 and 3.

Broadly speaking, special libraries in industry or commerce are distributed throughout the range of sizes, except the 'under 100' groups. Public corporations tend to be in the largest size-group. Learned and professional society libraries fall into either the very small or the very large, reflecting their national memberships. Most responding government department special libraries fell

EMPLOYER GROUP	NUMBER	% OF RESPONSES
Private industry and commerce	312	44.7
Public corporation (including nationalized industry, water authorities, etc.)	39	5.6
Learned or professional society	68	9.7
Research or trade association	69	9.9
Government department, station or agency (including NHS units)	143	20.5
Local government	15	2.1
Other	52	7.4

TABLE 1: *Distribution of respondents by employer group ('Other' includes institutes attached to universities, charities, trade unions, political parties, religious bodies and organizations and leisure organizations.)*

GROUP	NO.	%	GROUP	NO.	%
Under 100 employees	122	18	Under 100 potential users	179	26
101–1000 employees	260	38	101–1000 potential users	320	46
1001–5000 employees	160	23	1001–5000 potential users	122	18
5000+ employees	144	21	500+ potential users	69	10
TOTAL	686		TOTAL	690	

TABLE 2: *Size of responding special libraries by number of employees in organization and number of actual and potential users*

PROF. STAFF	NO.	%	NON-PROF. STAFF	NO.	%
0	163	23	0	98	14
1	281	40	1	216	31
2	105	15	2	141	20
3	54	8	3	82	12
4–5	43	6	4–5	62	9
> 5	50	7	6–9	47	7
TOTAL	696		> 9	49	7
			TOTAL	695	

TABLE 3: *Size of responding special libraries in terms of numbers of professional or non-professional staff employed*

into the '101–1000' groups, and the majority of special libraries in the 'other' category fell, as might be expected, into the smallest.

It should be noted that 'professional' in Table 3 was defined by the respondents, and does not refer to any particular professional qualification. Of the persons filling in the questionnaire, 380 were styled 'Librarian' or equivalent, 126 were styled 'Information officer' or equivalent, eighty-nine had titles combining the library and information concepts, thirty-seven had a title which coupled a library or information label with a descriptor of another job, and fifty-eight bore titles which did not refer to an information or library role.

Extent of user education

390 respondents reported, without qualification, that library instruction is given in their organization, 151 reported that it was not, and 157 said that 'it depends'. It can therefore be seen that 78.4 per cent of all respondents gave instruction to their users either as a general practice or in certain circumstances. The factors on which provision of instruction was stated to depend are summarized in Table 4.

For practical purposes, 'Yes' and 'It depends' responses can be pooled; both are affirmative, and can be taken as indicative of a policy of at least some provision of or concern for user instruction. Table 5 shows numbers of organizations providing instruction, broken down by employer categories.

It appears that private industry is slightly less likely to provide some form of user education than the respondents taken as a whole (although the effect is not marked), and government or local government libraries are more likely than most to provide it, as to a smaller degree, are research or trade associations. Non-provision is most likely in the learned or professional society context, which, given the nature of use of these libraries (serving a widely dispersed population, and frequently as library of last resort) is not surprising. As might be expected, provision of user education is positively related to size as indicated by the various measures of size used. The relationship with 'total organization size' is not marked, but is highly significant with numbers of frequent users, and with numbers of professional staff, both of which are more meaningful indicators of the practical workload of a library or information department.

FACTOR INFLUENCING PROVISION OF INSTRUCTION	NO. OF RESPONSES	% OF TOTAL RESPONSES
Demand by or interest of user—instruction provided at specific request of expressed general interest of user	70	45
General status of user, e.g. newcomer to organization, senior staff	47	30
Need of user as perceived by librarian/information officer—'the lost look on their faces'; extra help given to those who appear to need it	29	18
Activities of user in organization, i.e. users in a particular department or with particular duties or a particular area of interest	17	11
Amount of library use—instruction given to actually or potentially frequent, regular users	10	6
Nature of library use—instruction given to personal users only, not postal or phone users	10	6
Nature of services required by user—selective instruction in relation to library services; particular services explained (or *not* explained, as the case may be)	9	6
Time or lack of time	9	6
Others, including user competence, number of new recruits, availability of a new system to be demonstrated	7	4
Unspecified or unclear	4	

Number of respondents 157. Number of comments giving influencing factors 212.

TABLE 4: *Factors influencing the provision of instruction*

	YES + IT DEPENDS	NO	TOTAL	
Private industry and commerce	232 (74)	80 (26)	312	
Public corporation	30 (77)	9 (23)	39	
Learned or professional society	46 (68)	22 (32)	68	
Research or trade association	58 (84)	11 (16)	69	
Government/local government	139 (88)	19 (12)	158	
Other	42 (81)	10 (19)	52	$\chi^2 = 17.76$ df. 5
TOTAL	547 (78)	151 (22)	638	$P < 01$

TABLE 5: *Number of organizations providing instruction (Percentages of each employer sector responding 'yes' or 'no' are shown in parentheses.)*

Multiple responses to a question asking for definition of the main subject coverage of each library make exact analysis impractical, but Table 6 suggests that libraries covering science, technology or medicine are more likely than others to provide some user instruction; however, this effect is possibly due to the incidence of larger libraries in this area of interest.

		ANY LIBRARY (USE INSTRUCTION)		
MAIN SUBJECT DISCIPLINES	TOTAL	YES	NO, NO ANSWER	IT DEPENDS
Base	698 (100)	390 (100)	151 (100)	157 (100)
Science, technology, medicine	357 (51)	211 (54)	61 (40)	85 (54)
Engineering	171 (24)	91 (23)	38 (25)	42 (27)
Non-technical social sciences and humanities	247 (35)	138 (35)	61 (40)	48 (31)
Mixed disciplines	129 (18)	62 (16)	29 (19)	38 (24)

(percentages rounded)

TABLE 6: *Incidence of instruction by subject coverage (Multiple responses allowed.) (Figures in parentheses denote percentages.)*

The factors influencing selective provision of instruction given in Table 4 when compared with employer group, indicate some preference by government departments for considering the work activities of users. This contrasts with private industry and commerce which deemed personal usage and time available more important. Learned and professional societies, not unexpectedly, appear to react to requests from users. It should be noted that the small number of total responses in this comparison demand caution in interpretation of findings.

Table 7 below shows the forms of user education provided in each of the employer categories. Multiple response was permissible, so that a library for example providing a printed guide might also give one or more lectures about information use or services available.

In broad terms it can be seen that about two-thirds of all special libraries who replied to the questionnaire introduce at least some of their users to the library by giving a conducted tour either to individuals or to a group, about a quarter issue printed guides to available services, and about an eighth (except in govern-libraries) given an introductory lecture. Government and local government libraries, who are the most likely to give instruction, are also the heaviest users of each of the modes of giving it. This may possibly be because of a greater degree of formality implicit in government or local government service. The 'Other form' category is characterized by such phrases as 'on-the-job', 'supervision at the time of usage', 'individual discussion' and 'highly informal', and clearly refers to an *ad hoc*, unstructured or unprogrammed form of user instruction or assistance usually given at the time of need, and possibly, therefore, more effective than the 'other' label might imply.

Table 8 shows the frequency with which particular topics formed part of user instruction in different employer groupings. Quite predictably, virtually all instruction includes coverage of the resources and services of the library

	PRINTED GUIDE	TOUR OF LIBRARY	INTRO. LECTURE	INFORMAL GROUP DISCUSS.	GUIDED PRACTICAL ASSIGN.	LECTURE SERIES	GROUP DISCUSS. SERIES	OTHER
Private industry and commerce	73 (23)	192 (62)	49 (16)	27 (9)	40 (13)	5 (2)	2	24 (8)
Public corporation	17 (43)	24 (62)	5 (13)	4 (10)	4 (10)	2 (5)	1 (3)	7 (18)
Learned or professional society	16 (24)	41 (60)	7 (10)	2 (3)	4 (6)	1 (1)	1 (1)	4 (6)
Research or trade association	16 (23)	48 (70)	9 (13)	8 (12)	3 (4)	1 (1)		4 (6)
Government/local government	56 (35)	108 (68)	54 (34)	16 (10)	25 (16)	7 (4)	1 (1)	14 (11)
Other	19 (37)	35 (67)	12 (23)	3 (6)	6 (12)	1 (2)		4 (8)
TOTAL	197 (28)	448 (64)	136 (19)	60 (9)	82 (12)	17 (2)	5 (1)	57 (8)

Percentages of each employer sector providing instruction in each form are shown in brackets (e.g. 23% of the industry and commerce respondents to the questionaire issue a printed guide to the library). Seven respondents giving instruction did not specify for form.

TABLE 7: *Forms of user education*

	LIBRARY LAYOUT	OWN LIBRARY RESOURCES/ SERVICES	OTHER LIBRARY RESOURCES/ SERVICES	BASIC GENERAL REF. WORKS	CATALOG USE	USE OF BIBLIOGR. TOOLS	BIBLIO-GRAPHIC SOURCES	PRACTICAL LIT. SEARCHING	COMPUTER IR	SPECIAL INSTR.	OTHER
Private industry and commerce	201	219	122	135	145	55	54	49	30	15	14
	(87)	(94)	(53)	(58)	(63)	(24)	(23)	(21)	(13)	(6)	(6)
Public corporation	22	29	18	10	14	12	7	6	6	4	2
	(73)	(97)	(60)	(33)	(47)	(40)	(23)	(20)	(20)	(13)	(7)
Learned or professional society	39	40	13	16	38	11	12	7			
	(85)	(87)	(28)	(35)	(83)	(24)	(26)	(15)			
Research or trade association	50	51	27	21	42	14	13	8	4	1	2
	(86)	(88)	(47)	(36)	(72)	(24)	(22)	(14)	(7)	(2)	(3)
Government/local government	118	134	72	66	98	39	35	34	11	4	3
	(85)	(96)	(52)	(47)	(71)	(28)	(25)	(24)	(8)	(3)	(2)
Other	36	40	18	19	32	13	11	14	2	1	2
	(86)	(95)	(43)	(45)	(76)	(31)	(26)	(33)	(5)	(2)	(5)
TOTAL	466	513	270	267	369	144	132	118	53	25	23
	(85)	(94)	(49)	(49)	(67)	(26)	(24)	(22)	(10)	(5)	(4)

Percentages in parentheses are based on number of respondents giving instruction in any form (e.g. 64 per cent of the industrial and commercial respondents who give instruction cover library layout in that instruction).

TABLE 8: *Frequency of user instruction*

itself, or its physical layout. Use of the catalogue is generally the next most popular topic of instruction, although it is worth noting that both industry and public corporation libraries give proportionately less importance to this topic than other employer groups' libraries; this may be because both types of library are more likely to give active service, such as an SDI service or bulletin to their users, who in consequence have a lesser need to search through catalogues; it may be because these libraries are more likely to use machine-generated indexes; or it may be that by their nature they make proportionately more use of published abstracting and indexing services as location and search guides.

Table 9 indicates the relationship between form and content of instruction. This table must be interpreted with some caution, because it does not show the form of instruction adopted for the presentation of a particular topic; each cell gives the number of respondents using a specific form of instruction who also stated that they included a particular topic somewhere in their instructional programme. (Multiple responses were allowed.) For example, of the 197 libraries who issue a printed guide, twenty-three (12 per cent) give some instruction in computerized information retrieval. There are indications that users of more sophisticated instructional forms also cover more sophisticated topics than those who give less instruction, as one might expect.

Comparing both form and content of instruction with size as measured by frequent user population, Tables 10 and 11, it can be seen that larger user populations have a higher likelihood of receiving organized instruction over a broader range of topics than smaller populations.

Conclusions

There can be little argument that the characteristic services offered by special libraries are bound up in a complex way with attitudes to, and forms of provision of, user education. If it were possible to identify a particular 'philosophy' of special librarianship, then this would probably have in it well-developed notions of specific and individual intensive service to the user; this being the case, it is possible to envisage extensive user education as a integral element in this service, where economic constraints allow it. The conclusions of this study help to illustrate that the overall state of user education in special libraries is characterized by considerable variety. Government departments were more likely to give instruction than private industrial/commercial organizations. Where instruction was given selectively, government departments tended to take into account the general status or work activities of users, in contrast to private industry/commerce where regular, personal usage and time available were more important factors. Learned professional societies, on the whole, only gave instruction at the request of the users. Government departments were also more likely to utilize lectures as a format of instruction than other employer groups. Units with a science as a major discipline were more likely than those with social sciences or humanities as a major discipline to instruct users. The type of instruction in the science units, excluding engineering, tended to be more extensive and covered more in-depth areas of literature use compared with social sciences and humanities units. Although time available to librarians/information officers influenced the amount of instruction given, especially to

	PRINTED GUIDE	TOUR OF LIBRARY	INTRO. LECTURE	INFORMAL GROUP DISCUSS.	GUIDED PRACTICAL ASSIGN.	LECTURE SERIES	GROUP DISCUSS. SERIES	OTHER	TOTAL
Library layout	168 (85)	410 (92)	119 (88)	50 (83)	73 (89)	12 (71)	4 (80)	41 (72)	466
Own library resources/services	189 (96)	435 (97)	134 (99)	57 (95)	81 (99)	16 (94)	5 (100)	49 (86)	513
Other library resources/services	98 (50)	231 (52)	70 (51)	36 (60)	45 (55)	10 (59)	3 (60)	27 (47)	270
Basic general ref. works	100 (51)	229 (51)	77 (57)	37 (62)	53 (65)	12 (71)	4 (80)	26 (46)	267
Catalogue use	147 (75)	328 (73)	101 (74)	40 (67)	67 (82)	9 (53)	5 (100)	30 (63)	369
Use of bibliographic tools	64 (32)	124 (28)	51 (38)	24 (40)	37 (45)	11 (65)	8 (80)	16 (28)	144
Bibliographic sources	60 (30)	111 (25)	43 (32)	23 (38)	34 (41)	8 (47)	4 (80)	16 (28)	132
Practical literature searching	44 (22)	95 (21)	43 (32)	21 (35)	47 (57)	10 (59)	4 (80)	16 (28)	118
Computerized information retrieval	23 (12)	44 (10)	17 (13)	8 (13)	12 (15)	5 (29)	2 (40)	4 (7)	53
Specialized instruction	15 (8)	22 (5)	12 (9)	7 (12)	6 (7)	1 (6)	—	3 (5)	25
Other	10 (5)	17 (4)	10 (7)	8 (13)	6 (7)	2 (12)	—	3 (5)	23
TOTVL	197	448	136	60	82	17	5	57	

Percentages in parentheses show proportion of those using a particular form of instruction who also cover a particular topic (not necessarily by that form of instruction)

TABLE 9. *Form and content of instruction*

NO. OF FREQUENT USES	TOTAL YES/ DEPENDS	FORM OF INSTRUCTION								
		PRINTED GUIDE BOOKLET	TOUR	INTRO. LECTURE	INFORMAL GROUP DISC.	GUIDED PRACTICAL ASSIG.	SERIES LECTURE	SERIES GROUP DISC.	OTHER	NO ANSWER NONE
Base	547	197	448	136	60	82	17	5	57	7
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(00)
0–9	19	2	13	3	3	—	—	—	4	—
	(3)	(1)	(3)	(2)	(5)	—	—	—	(7)	—
10–19	39	6	32	7	2	4	—	—	5	1
	(7)	(3)	(7)	(5)	(3)	(5)	—	—	(9)	(14)
20–29	61	26	51	19	8	11	1	—	3	—
	(11)	(13)	(11)	(14)	(13)	(13)	(6)	—	(5)	—
30–49	72	22	58	9	5	8	2	—	8	1
	(13)	(11)	(13)	(7)	(8)	(10)	(12)	—	(14)	(14)
50–99	80	31	66	19	9	12	1	1	10	2
	(15)	(16)	(15)	(14)	(15)	(15)	(6)	(20)	(18)	(29)
100–149	23	9	21	9	2	3	—	1	6	—
	(4)	(5)	(5)	(7)	(3)	(4)	—	(20)	(11)	—
150–199	6	3	6	1	3	1	—	—	2	—
	(1)	(2)	(1)	(1)	(5)	(1)	—	—	(4)	—
200–299	19	12	16	7	3	5	—	1	2	—
	(3)	(6)	(4)	(5)	(5)	(6)	—	(20)	(4)	—
300–399	2	2	2	1	—	1	—	—	—	—
		(1)		(1)	—	(1)	—	—	—	—
400–499	3	3	3	1	1	2	1	—	—	—
	(1)	(2)	(1)	(1)	(2)	(2)	(6)	—	—	—
500+	6	4	6	2	1	2	1	1	3	—
	(1)	(2)	(1)	(1)	(2)	(2)	(6)	(20)	(5)	—
Impossible to judge,	217	77	174	58	23	33	11	1	14	3
No answer	(40)	(39)	(39)	(43)	(38)	(40)	(65)	(20)	(25)	(43)

TABLE 10: *Comparison of no. of frequent users with form of instruction (figures in parentheses denote percentages.) (Multiple responses were allowed for form of instruction.)*

		CONTENT OF INSTRUCTION											
NO. OF FREQUENT USERS	TOTAL YES/IT DEPENDS	LAYOUT LIBRARY	LIBRARY RES. & SERVICES	OTHER LIBRARY RES. & SERVICES	BASIC GEN. REF. WORKS	CATA-LOGUE USE	USE BIBL. GRPHC TOOLS	BIBL. GRPHC SERVICES	PRACTICAL LIT.	TECH-COMP. INFO.	SPEC-LISED INST.	OTHER	NO ANS./ NONE
Base	547	466	513	270	267	369	144	132	118	53	25	23	15
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
0–9	19	17	16	4	7	10	—	2	2	1	1	—	1
	(3)	(3)	(1)	(1)	(3)	(3)	—	(2)	(2)	(2)	(4)	—	(7)
10–19	39	33	36	20	13	25	5	6	8	3	—	1	2
	(7)	(7)	(7)	(7)	(5)	(7)	(3)	(5)	(7)	(6)	—	(4)	(13)
20–29	61	55	58	29	31	37	16	13	5	2	2	5	1
	(11)	(12)	(11)	(11)	(12)	(10)	(11)	(10)	(11)	(9)	(8)	(22)	(7)
30–49	72	65	68	47	36	45	16	14	15	6	2	1	1
	(13)	(14)	(13)	(17)	(13)	(12)	(11)	(11)	(13)	(11)	(8)	(4)	(7)
50–99	80	62	72	41	31	46	20	14	16	5	4	3	4
	(15)	(13)	(14)	(15)	(6)	(12)	(14)	(11)	(14)	(9)	(16)	(13)	(27)
100–149	23	22	23	12	10	18	9	10	7	5	5	2	—
	(4)	(5)	(4)	(4)	(4)	(5)	(6)	(8)	(6)	(9)	(20)	(9)	—
150–199	6	6	6	4	6	5	4	5	4	2	—	—	—
	(1)	(1)	(1)	(1)	(2)	(1)	(3)	(4)	(3)	(4)	—	—	—
200–299	19	18	19	6	10	16	4	5	2	3	2	—	—
	(3)	(4)	(4)	(2)	(4)	(4)	(3)	(4)	(2)	(6)	(8)	—	—
300–399	2	2	2	1	2	2	2	1	2	—	—	—	—
					(1)	(1)	(1)	(1)	(2)	—	—	—	—
400–499	3	3	3	2	3	3	3	2	2	—	—	1	—
	(1)	(1)	(1)	(1)	(1)	(1)	(2)	(2)	(2)	—	—	(4)	—
500+	6	5	6	3	4	6	2	2	2	1	—	1	—
	(1)	(1)	(1)	(1)	(1)	(2)	(2)	(2)	(2)	(2)	—	(4)	—
impossible to judge, no answer	217	178	204	101	114	156	63	58	45	22	9	9	6
	(40)	(38)	(40)	(37)	(43)	(42)	(44)	(44)	(38)	(42)	(36)	(39)	(40)

TABLE 11: *Comparison of no. of frequent users with content of instruction (figures in parentheses denote percentages.) (Multiple responses were allowed for content of instruction.)*

managerial/administrative users, it was not an overriding inhibitive factor. Instruction was more likely to be given in units where there was also a high level of 'publicity' generating activity. Many interviewees referred to the importance of the promotional value of user instruction for the unit. On the whole, interviewees felt that some user instruction was necessary in special libraries, favouring the continuance of some impromptu instruction alongside the more organized instructional activities. Finally, as suggested above, the general nature of relations and activities in units, a tendency to interrelate with users on a very personal level, influenced the general style and approach to instruction the librarians/information officers viewed as desirable.

We may conclude, therefore, that a number of administrative or operational changes might enhance the role of user education programmes in general as they operate within special libraries. For example, heads of units who decide that instruction is necessary for all or some users should make it a *policy* decision, and publicize their activities as such. At the same time there is scope for greater concentration on existing users of services, including specialists and managerial/administrative staff, rather than simply attendance to the needs of new recruits.

Similarly, established users might be offered instruction when they change projects or responsibilities, at which time they are likely to perceive the relevance of the instruction. Such improvements would imply a closer liaison with other departments within the organization, particularly those that make heavy use of the unit, to promote efficient feedback on work and personnel changes and developments. We would note here that more comprehensive instruction in literature and information use could be given to professional workers in the humanities and social sciences. Where librarians and information workers are able to impart their knowledge effectively, and their general powers of communication and explanation are well-developed, then both the instruction of users and the continuing relationship with users will be markedly improved. Therefore, if we regard the welfare of the user as the highest priority, then this in its turn suggests that the provision of short courses and advice on instructional techniques for librarians/information workers is vitally necessary, in order that users will ultimately gain by being made aware, in the most effective manner, of the existence of information resources and services both within and outside their own organizations.

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Notes on copyright, including references to the report of the Whitford committee

Eric H. Ratcliffe

The author is a Technical Editor
in the Water Industry

1. Introduction

THIS ARTICLE INCLUDES information relevant to specialist or technical establishments and their authors, both as copyright holders in respect of self-publications, and also as users of copyright material of other establishments and authors. Answers to problems in depth will need reference to the *Copyright Act, 1956*[1] which succeeded the Act of 1911,[2] or to authorities listed in the references. The most comprehensive account is *Copinger and Skone James on the Law of Copyright*[3] which has run through many editions.

Technical advances affecting copyright material, and the needs of any busy technical/research establishment—normally not vitally concerned with copyright matters until they intrude during the course of the work—make it essential that some details and rules be known at least well enough to avoid error or wasted time in delving for information. This report is of course supplementary to major problems where legal advice should be taken, but it is designed to guide and interest.

Copyright law as set out can be confusing, and there exist few adequate guiding texts between the extremes of legal discourses and short expositions for private authors. It is probable that copyright problems in the technically-geared establishment not wholly concerned with them are often treated ephemerally by management and employees, enough to ensure no abnormal risks are courted. Moreover no worker normally will have the time or responsibilities to justify writing about copyright, while administrators will be more concerned with legal policy than the occasional minor problems at bench and publication level with pieces of presented research.

It is evident that the time is right for a further Act; those interested should refer to *Copyright and Designs Law. Report of the Committee to Consider the Law on Copyright and Designs*[4] (subsequently referred to as 'the Whitford Report' or as 'Whitford'), which in 1977 published a summary of recommendations, including the statements 'the general structure of the Copyright Act of 1956 should be revised in order that the law may be placed on a plain and uniform basis' and 'there should be one comprehensive definition section placed at the beginning of any new Act, a system found or proposed in many other countries'.

Because the last two Acts, of 1911 and 1956, were preceded respectively by reports of committees appointed in 1909[5] and in 1951,[6] it may reasonably be expected that a new Act on copyright or a substantial Act of amendment will succeed the Whitford Report sometime in the 1979–86 period. Pressures from various interested parties—publishers, authors, information centres—must

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always remould the imperfections in copyright law unless some other solution is to be found. There are still inadequacies in international procedure dealing with copyright: Clark[7] recently pointed out UK publishers' difficulties within the EEC, for example. US copyright law has recently been re-examined (this report, Section 5.5), affecting the attitude to copyright of British journals on the American market, with some repercussion on authors submitting to such journals or to US journals.

2. Background and general considerations

Basically, copyright law is intended to give protection against 'copying' to those who have created what are defined as 'works'. In general, growth in the scope of such protection is given impetus not only in consequence of the need to protect additional types of works, but also because technology builds a greater capacity for copying into new reproduction methods.

Authors' rights in relation to 'literary works' were recognized at common law a few centuries before the first copyright legislation (1709), which only gave protection to books in the reign of Anne, and this at a time when books were scarce and dear, and the two-page London Gazette the only paper allowed to be printed. However, the Act itself revealed its own inadequacies, leading to increased scope in protection. With the most recent (1956) Copyright Act, such protection included that for literary, dramatic and musical works (1956 Act, Section 2) and artistic works as particularly defined in its Section 3 (paintings, sculptures, drawings, engravings, photographs, works of architecture, and other examples of craftsmanship).

The protective restrictions relevant to this article, apart from various exceptions which the 1956 Act has amplified, include reproduction in any material form, publishing, and making adaptations embracing translating; but, for the purposes of this report, the concern is mainly with literary works, associated artwork, and maps.

'Copyright' is defined in Section 1 (Subsections 1 and 4) of the 1956 Act as the exclusive right to do or authorize certain acts in relation to a work according to the provisions of the Act, which mentions later what these 'works' and 'acts' are. Copyright therefore has meaning (but no simple definition nowadays) in relation to the legal framework; the word seems an awkward literary hybrid which has outgrown its past. (A short digestible history is to be found in Whale's[8] chapter on evolution of copyright.) 'Right to copy', or even 'right of prevention of copying', is an oversimplification nowadays. Whale suggests 'author's property right', pointing out that 'copyright' was originally and for a long time simply 'the right to copy' and was a publishers' right, and that the booksellers of the early days, who were also the publishers, thus created the right to protect their trade. On the other hand[3a] he agrees that the 'property' theory is unsatisfactory since one is dealing with intangible or intellectual (see also Whitford[4] Section 13) property, and even then the 'property' may be declared to belong to someone else. There are other 'definitions' from other countries. It is doubtful whether satisfactory definitive terminology will be achieved internationally, but there is agreement that the meaning of UK copyright in relation to a future act should be stated in less dispersive form.

3. Copyright in unpublished literary works

Copyright, vested in a corporate body or individual employer, subsists in unpublished literary works made by 'qualified' persons (see Glossary) in the course of their employment, including also certain experimental notes written in the course of duty which are not isolated jottings (Sections 2 and 4 of the 1956 Act). Duration of copyright does not apply until the act of publication has the effect of commencing the term of copyright as a published item, so copyright is perpetual until this act. Copyright, though immediately acquired for the employer on the basis of the unpublished work, especially where scientific research is concerned, should be treated preciously where needed: thus it is sometimes important that evidence of completion of unpublished script is obtained as a protection against an outsider establishing prior claim to knowledge.

The copying or use of unpublished works, even though the intention is not to officially publish them, may constitute infringement by an outside body. Since copyright continues with the employer after the employee has left, leavers should make sure they do not infringe in making use of notes made during employment.

A third party who copies or adapts an oral presentation of a paper read verbatim from a written version without permission may also be infringing. However, papers read *extempore*, with or without skeleton notes, are not apparently protected as the law stands, and if these are recorded or transcribed outside, copyright would seem to be acquired by the outside body without redress, as the presentation then materially exists. Whitford[4a] recommends that, in these cases, it should be clarified that the copyright of the contents of the recorded or transcripted version vest in the speaker, and that there be a separate copyright in the recording or transcript. Whitford also discusses the right of a shorthand-recorder to a separate copyright in the shorthand version, this being arguable, and recommends that this issue be clarified.

It therefore might be advisable to stay close to written notes when presenting papers on behalf of one's employers; otherwise there may be no protection against the presentation being used in circumstances in which the employer has no copyright in content, being in an invidious position where he would have to seek permission from an outside body which has acquired copyright and has published a very similar version through transcript or recording.

4. Typographical copyright and copyright assignment—papers sent for publication

It is a common error to assume that a scientific paper sent to a periodical and subsequently published in it causes the author or his employer to lose complete copyright to the periodical owner. So far as a periodical published from the UK is concerned, acceptance for publication only implies that the author or his employer has given licence for the original paper to be used in the particular typographical arrangement of the periodical and by virtue of this, the publisher is entitled only to the copyright in the typography of his set-up, unless the copyright is assigned by a document.

It follows that if a periodical owner sends a form to an author requesting signature in agreement to transfer copyright before his MS is accepted, the publisher is seeking rights over and above his normal entitlement of copyright in the eventual typography and the simple license to publish. In these cases the document should be read carefully and expert advice sought. 'Conditions of acceptance' in periodicals need to be scanned carefully for statements relating to copyright; such statements should be queried where there is doubt, in the author's own interests. No assignment of copyright is legally effective unless in writing and signed by the assignor. Although the assignment form should tell the author exactly what acts restricted by copyright are being assigned, the small print often tells the author only what rights he will retain, which is not informative to an author unfamiliar with such procedures. Although there are usually concessions to allow an employer to self-publish the results of a paper, the copyright of which has already been assigned, he must consider whether assignment to a particular source of information concerning research work might not be restrictive should he wish in the future to disseminate his results through other media. A degree of flexibility might be useful in the long term.

In the absence of any agreement such as above, there is no reason barring general etiquette why the author should not send copies of his paper for consideration to as many journals as he wishes if he can avoid committing himself to passing on exclusive license to publish, and to assignment of copyright. His main interest is often to disseminate his results over as wide a field as possible, and not to have these controlled, provided his work is worth the exposure.

Copyright in typographical arrangement as belonging to the publisher was, at the time of the 1956 Act, a new form of copyright (Act, Section 15) designed to prevent exact copying of published editions for resale by the unscrupulous, and to protect the costs incurred in setting up the type; it is independent of the main copyright and is limited to a duration of twenty-five years from the end of the year in which the edition was first published, where UK copyright applies, so long as the arrangement does not copy any previous edition. Facsimile copying beyond that permitted by the Library Regulations (Section 5.2 this article) can then occur without penalty provided that the normal copyright in the work itself is not transgressed.

5. Reprographic reproduction—libraries, etc.

5.1. Preliminary

Most special libraries conform to the definition, in the Libraries (Copyright) Regulations 1957,[9] of those allowed to copy, by the provisions in Section 7 of the 1956 Act amplified in the above regulations, because they facilitate and encourage study in a field approved by a Schedule in the Regulations.

Problems of interpretation of this legislation have been centred on practical everyday events involving copyright, for example, the practice of copying from periodicals and other texts. From the point of view of a 1979 user, the Regulations restrict free flow of information under information explosion conditions which didn't exist at the time of the Gregory Committee which produced the report[6] preceding the 1956 Act. The Regulations require librarians to use up busy time as watchdogs; inevitably there are short cuts and areas of doubt, nevertheless we have lived with these rules for many years with some degree of accommodation.

5.2. The copyright (libraries) regulations

These regulations were made by the then Board of Trade in 1957, following Sections 7 (Subsections 1, 3, 5) and 15 (Subsection 4) of the 1956 Copyright Act. Their structure is simple, although they are the product of a more leisurely age when integrity of interpretation was a simpler matter. Contents and rules may be summarized as follows:

- a Lists of designated libraries (First and Second Schedules in the Regulations) to which the following scheme applies.
- b Copies by librarians for librarians:
  - i Non-periodicals. Copies of works or parts of same:
    - 1 One copy may be supplied to any designated library, including one that makes works available free of charge to the public, whether or not it is conducted for profit.
    - 2 The supplying librarian does not know, or could not reasonably find, the name and location of any person entitled to authorize making of the copy.
    - 3 Any previous copy supplied must have been lost, destroyed, or damaged.
    - 4 The recipient library must pay for the copies a sum not less than the production costs.
  - ii Periodicals or periodical articles: As i, excluding 2. (N.B. (i and ii)—the whole periodical may be copied if the conditions are complied with.)
- c Copies by librarians for individuals.
  - i Periodical articles:
    - 1 The copying library must be a designated class in the Schedules but not be established or conducted for profit.
    - 2 The copies must be used for research or private study only.
    - 3 Two or more copies of the same article must not be supplied.
    - 4 Not more than one article from a periodical should be supplied.
    - 5 The recipient must pay for them a sum not less than production cost.
  - ii Non-periodicals. Copies of parts of works:
    - As c i 1, 2, 5 plus.
    - 6 Not more than one copy of part of the work may be supplied.
    - 7 Only a reasonable proportion of the work may be copied. (See also this article, 7.5.1)
- d The well-known 'Form of Declaration and Undertaking' published as the Third Schedule to the Regulations, in which the individual requests the librarian for a copy of an article or part of a work and certifies by signature that no previous copy has been supplied and that such a copy will only be used for research and private study.

5.3. Outside interests

It is useful to examine the background to Whitford before setting down the findings. It was the opposition of interests in the library/information field and those in the profit publishing/professional author field which led to the formulation of Section 7 of the 1956 Act through implementation of the Gregory Committee[6] proposals earlier. Such opposition of interests has widened, given present stringent economic conditions at the same time as large-capacity computer storage and the advent of the documentation centre. This author, however, is not aware of any listings by publishers of actual financial losses attributed to reprographic copying, and possibly Whitford has been unduly influenced on that score. But as demand for information rises it is inevitable that the views of those who could stand to lose out should harden. Extrapolating, though losses for publishers may be difficult to delineate, some solution is needed to lessen the risk of their eventually becoming stark reality. If it is true that the fears of publishers may be unrealistic, it seems equally unrealistic that copying in part may stimulate the purchase of the whole or otherwise be for the benefit of the publisher of the original. It may be better to be cautious and to incorporate in legislation some preventive measures relevant to this possible financial loss as soon as tendencies are obvious. Certainly as regards learned journals, the statement[4b] rings true that publishers felt that library copying was affecting subscriptions. We must not lose sight of the viability of our learned journals, grounded in their tradition of interest in the advancement of science without condescension to fashion or expediency; in this respect, publishers of such journals surely have the backing of most reputable libraries.

5.4. *Published comment*

Aside from such comment as the Whitford Committee has collected, an article[10] on the availability of British Standards Institution's publications refers to financial considerations: '. . . it is not BSI policy to lend BS publications—their task is to sell them . . . Ironically, a really first-class loans-by-return service would cause BSI's sales to fall, thus setting off another twist in the inflationary price spiral. But sales would surely pick up again when the need for file copies was appreciated. A greater danger is wholesale copying. Perhaps the new Committee enquiring into Copyright will come up with a sensitive alternative—the licensed facsimile transmission of standards in data sheet format possibly from a BSI master copy.'

An American publisher[11] responsible for many scientific and technical journals concludes that scientific journals and the entire open literature of scholarly publications are now endangered through excess photocopying and consequent cheap access to separate articles; he believes that mass library involvement in photocopying will reduce the foundation-stone of journal subscription, causing higher prices for journals and losses in subscriptions, until the journal is no longer viable. Should this happen he fears takeover by Government or large business conglomerates, extrapolating to an Orwellian situation. Some of his remarks are directed against the British Library Lending Division (BLLD) which, in accordance with copyright requirements in provision of copies, are providing the kind of cheap service referred to.

In some opposition to the above, Oppenheim[12] points out that higher BLLD charges would be counter-productive as they would restrict library budgets and lead to fewer journal subscriptions, also mentioning that studies have demonstrated that most of the use of the BLLD involves borrowing or photocopying of 'core' journals which have widespread assured sales, rather than of financially precarious peripheral journals. However, he agrees on the possible dangers of Government information and large-scale business networks if the scientific journals are gradually phased out (see also Refs 13, 14).

The point has been made[15] that the research work of a writer is made difficult by secrecy surrounding deals in rare manuscripts and their eventual place of filing. A computer index of English language material, including details of relevant copyright holders, nationally or internationally administered, has been suggested. It would be a legal obligation for papers brought abroad to be copied into microfilm for storage in deposit libraries. A stage where greater freedom for copying literary work exists, operating for a number of years after the death of the author, has also been suggested. An obvious attitude has been brought out: 'The photocopying machines that crowd our libraries, airports and hotels are open invitations to break the law'. Finally it has been suggested in this argument that there should be a levy of a copyright fee charged annually to the companies marketing the machines, the collected money being distributed to the writers by schemes similar to those proposed by the Society of Authors and other bodies.

Crabb[16] mentions difficulties in free use of copyright material by lecturers and teachers, together with those arising over copyright ownership of scripts, speeches and recorded lectures. In the latter respect he points out that most lecturers are employed under a contract of service and that although the 1956 Act states that the author is the first owner of most works unless produced 'in the course of employment under a contract of service', most lecturers have traditionally 'kept the copyright' in their lecture notes because it is recognized that their creation was for the convenience of the author and not in the strict execution of their duties. Aside from the concept that copyright is 'kept' by anyone, obviously such traditional action has rested on a generalization and points to a need for finer definition of the status of copyright material in such circumstances, either written into the contract itself or as part of an agreement outside it. This 'traditional' procedure does not seem valid in cases of talks given by employees of, for instance, research laboratories where content is highly charged with technical detail such as has been obtained during their employment.

One notes in passing an idea of the Government that wealth tax, if introduced, should include assessment of value of copyright property, and the *Sunday Times*[17] implies general lack of wisdom in this, pointing out the difficulty of determining the basis on which the assessors would work; furthermore wealth-tax systems already operate without consideration of copyright in Sweden, West Germany, and Austria.

5.5. Schemes of other nations

The Whitford Report points out[4c] that the subject of copying copyright works has long been internationally scrutinized but that a recent working group preferred the national approach. Whitford then summarizes the position in Sweden, Germany and the Netherlands; and, more briefly, some arrangements in Australia, Canada and the USA. Highlighted are: in Germany, an effective blanket license agreement between industry and the book trade regarding copying from scientific and technical periodicals of the home market for internal use in firms, fees being paid in various ways (one of which is by stamp attached to copy), collected centrally by a society, and the whole divided equally between publishers and authors; in the Netherlands a blanket scheme within public services based on a fee per page of copied material, with a special low rate for schools and arrangements for commercial firms only for scientific books and articles; in Sweden, Government payment of a fee for photocopying in schools to a combined author/publisher organization.

In the USA, the 'fair use' exception (very similar to the UK 'fair dealing' concept) is tightened by considering the effect of such use on the market potential or value of the document. Limitations on exclusive rights include also exceptions for reprography in USA libraries, being amplified in the American Act[18] revising US copyright law, leading to the setting-up of a Copyright Clearance Centre (CCC) with effect from 1.1.78, to collect fees and to distribute the money to copyright owners in respect of copying above amounts allowed without penalty. An identification code and copyright fee is to be seen on the first pages of articles in cooperating journals to aid fee collection and as indication of copyright holders' consents for personal copies to be made in USA. It remains to be seen whether this will seriously influence any forthcoming UK legislation. In the meantime the US law has involved British journals marketed also in USA who wish to cooperate to extract benefit; some it has been seen[19] to require their authors to sign an agreement giving them exclusive licence in publication for a period of six months, and this to allow the copying fees collected at CCC to be channelled into journal funds. The Institute of Physics in explaining the situation, states that it is not entirely clear whether in due course their authors also will need to assign full copyright, and not merely license to use over a short period. It therefore behoves research laboratories submitting scientific papers to keep in touch with the situation as it is possible that many journals connected with the CCC may only publish in future if the copyright is assigned.

Although protection for many scientific/research objectives are covered by registration systems for patents and designs and not by the copyright system, the publishing scientist should also consider the grey area of progress which includes non-registered or unregistrable items, and seek legal advice on the propriety of leasing or assigning copyright where such items include original principles/discoveries.

5.6. Submissions to the Whitford Committee

The Whitford Committee received over seventy submissions in respect of 'reprographic reproduction', some of which are summarized as follows:

Librarians: The signed declaration system (Third Schedule of the Libraries Regulations; see also Section 7 of the 1956 Act and 5.2d of this report) was stated to be irksome and of little value; since 'research was not defined, an individual could obtain a copy of a copyright text and use it not for his own private research but for commercial research purposes. The main concern was efficiency of the copying service for users; most libraries welcomed a blanket scheme under certain conditions, but the British Library hoped to be excluded from any such licensing scheme. Libraries were sympathetic towards the needs of authors and publishers but some held that library copying did not harm the latters' interests. More latitude to allow for replacement by photocopying, including copying into microform, was sought.

Publishers: They felt that copying affected journal subscriptions and journal viability; exceptions in favour of copying should exclude multiple copying and library copying at less than economic charges. It was mentioned that commercial libraries were excluded in the allowance for library copying in the Library Regulations. Publishers were divided on the question of blanket licensing.

Others: Authors' representatives were generally in favour of blanket licensing but in the field of scientific and technical periodicals there was little evidence of a demand for royalties. The legal profession thought that the system should be easy to understand and to operate, and requested the need for guidance as to what was allowable as 'fair dealing' and what constituted 'a reasonable proportion' (see also this report 7.5). A great deal of infringing copying takes place in schools; teachers wanted to make copies without delays. Documentation centre representatives thought that blanket licensing was the best solution to the copying problem.

5.7 Recommendations of the Whitford Committee

Blanket-licensing schemes are recommended, the onus being on the copyright holders to provide such schemes through their collecting organizations, the areas in which such schemes could operate being designated. Within these areas, if such schemes have not been set up, reprographic reproduction would not constitute infringement. Coin-operated machines would operate under licence, the finance and distribution being controlled by a single collecting body which would split the proceeds among the different organizations representing the copyright holders. Such schemes would cover the making of single copies and the point is made that, even for private purposes, the making of single copies is worth a royalty to the copyright holder in addition to the cost-of-production charge made at present under regulations. A reduced royalty or some other arrangement would probably have to be made to cover cases where there was considerable copying of non-copyright material, to avoid over-collecting by the collecting bodies. The licensing scheme would be extended to unpublished works where they are on open access. Collecting bodies would be under ministerial control. There would be provision for arbitration in the event of dispute by a copyright tribunal.

Whitford has not worked out any details of a blanket-licensing scheme; however, reprographic reproduction would still be a restricted act, and Section 7 of the Act, referring to special exceptions for libraries in respect of single copies, would no longer apply.

6. Computers

Copyright in computer work is a major technical subject still to be covered in the legislation, and no doubt, also, other storage and retrieval systems unrelated to computer processes may eventually need consideration. It is not so long ago, and after the 1956 Act, that Farradane and others put the information scientist on the map with early courses at the City University; since then, from the point where the information scientist was rather tentatively accepted as possessing a career in his own right, to the present vast expansion of his career prospects, the handled volume of software is enormous but the relevant copyright position as might be interpreted by that Act is very uncertain.

So far as a computer program can be regarded as a literary or artistic work, copyright protection could no doubt be offered under the 1956 Act and, as

Whitford has pointed out, common law provides for protection of trade secrets and proprietary information used in breach of confidence and could apply to the unauthorized use of a computer program. But this is not very satisfactory. The uncertain position, according to Whitford, has caused this covenant to appear in textbooks, usually near the normal copyright detail: 'No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of the publishers.'

Whitford[4d] gives consideration to programming, storage and retrieval. In view of the wide range of contacts between his committee and industry and the consequent submissions from that source, we might expect specific provisions, definitions, etc. on these subjects to be included in the next Act on copyright.

It is unfortunately the case that, in this and other related fields, changes in legislation are harmfully slow in relation to the pace of technical advancement. The legislation is static between one Act and the next, and each successive Act has to compromise between over-simplifying by considering all new items in terms of those of the preceding Act, and over-complicating by particularizing to include provisions for all technical advances in new legislation, using new terminology. A summary of the Whitford recommendations in relation to computers[4e] is given below; this seems to err on the side of over-simplification:

(i) All computer programs and other forms of computer software which have involved a sufficient degree of skill and/or labour to be considered as works in the normal copyright sense and which have been reduced to writing or other material form from which they can be reproduced should be clearly protected under copyright law, under the provisions for literary and (where appropriate) artistic works. In short, items of computer software should be treated as works and enjoy protection as such.

(ii) The storage of computer programs, or of any other copyright material, in a computer store should be a restricted act.

(iii) In relation to ownership and terms of protection, computer programs and compilations of data should be treated in exactly the same way as other copyright works.

(iv) In relation to works produced with the aid of a computer, the author of the output should be the person or persons who devised the instructions and originated the data used to control and condition the computer to produce the particular result.

(v) A majority also recommend that the unauthorized 'use' of computer programs to control or condition the operation of computers should be an infringement.

If these recommendations are implemented, the programming instructions, whether in writing, or in other form (magnetic, punched tape, etc.), would be considered as works already covered by the previous Act. The need to assess their complexities in relation to the production effort so that they may qualify as 'works' in the old sense appears to be the kind of woolly thinking which future legislation on copyright could well do without. The monetary aspect of the use of programs as published works must be minor; however, Whitford makes the point that protection will discourage secrecy and actually encourage publication, the volume of which is already small. But it is doubtful if there is much realism in this motive.

7. Miscellaneous

7.1. Commissioned work

Following the provisions of the 1911 Act, the 1956 Act places copyright in commissioned photographs, portraits and engravings with the commissioner, but does not extend this rule to literary works. Hence, unless there is some relevant term in the contract, copyright in reports done under repayment conditions would remain with the reporting organization, although if the contractor specified that a particular original photograph was to be made for in-text inclusion, then copyright might arguably remain with him, although the organization would still own the negative.

Submissions to Whitford on the question of ownership of copyright in commissioned literary works included the point of view of an encyclopedia publisher who commissioned the various articles from author sources, and who would subsequently hold no power against infringement in re-publication of parts of it, although he would hold copyright in the compilation as a whole; and the view of the British Copyright Council which was strongly opposed to copyright in any work being vested in the commissioner.

No doubt influenced by the fact that commissioners of works are usually well able to protect their interests by the terms of their agreement, Whitford[4r] recommends that the copyright in all commissioned works should belong to the author (or employer), subject to two important qualifications:

1. The person commissioning the work should have an exclusive licence for all purposes which could reasonably be said to have been within the contemplation of the parties at the time on commissioning.
2. The commissioner should have the power to restrain any exploitation for other purposes against which he could reasonably take objection.

7.2. Papers sent to periodicals

These submissions become automatically owned by the proprietor of the journal, the editor being in effect his agent, and there is no obligation at law to preserve any uninvited manuscript. Therefore, 'true copies' of work sent to journals, including work intended to be published as short memoranda or 'letters', should always be retained by the author/employer as it does not follow that unaccepted work will be returned. If at any time the author should decide to ask for the return of a manuscript before publication, and where the work has already been accepted and passed the referees, if any, there might be difficulties if printing has already commenced; sending in a manuscript implies a licence to publish. The law does not specify the stage at which retraction with impunity fails to operate. If the author has some early arguments about the form of the publication, or wishes to make changes, or disagrees with the referees, and such arguments are never resolved, then the implied licence to publish is revoked. Subsequently if the journal produces the article concerned with passages in which the author did not want, then the proprietor is infringing copyright and, in serious cases, action can be taken by the author/employer.

The publication of an altered passage does not, however, constitute infringement of copyright if the author has not objected to use of the paper for publication on account of the known alteration, but if the editor has, unbeknown, changed the wording of an undisputed passage for editorial purposes or policy purposes, then, in serious cases, any legal action contemplated could be on the grounds of infringement of copyright, all this following if there is only a licence to publish and the publisher has not acquired copyright by assignation. In the case of assignment, the author has no control over later additions and corrections to his work. Action in serious cases of alteration by a publisher who has already acquired copyright might have to proceed on the grounds that the work was altered in such a way as to not effectively be the author's/employer's own work; and that, by falsely representing it thus, the publisher has caused harm.

There is no copyright in titles, so in cases where the publisher wishes to protect a wording from being used again elsewhere as a title, it cannot do so, and the remedy is to pre-alter the title. No details can be found in the literature of any procedure possible when a publisher severely alters a title to an author's paper without consulting him, to make him change it back, and this does happen; but a possible preventive measure would seem to be the stipulation by the author on sending in the manuscript that the title must remain unchanged (if he is not to know beforehand of any proposed changes in it suggested by either editor or his referees). This holds, provided that there is only license to publish and not an assigned copyright; in the case of prior stipulation, the title can be looked on as integral with the paper for the purpose of the licence.

7.3. Translations

A translation of a literary work is one of the definitions of 'adaptation' in Section 2 (6) of the 1956 Act, and it is thus literally a restricted act to make a translation, if the whole or a substantial part of the work is concerned, and the translation is in material form (such as typescript), and permission of the copyright holder is needed for this and for any later publication of the translation. But it should be noted that the translator, whether he has obtained permission or not to translate, holds separate rights in the translation. Hence it follows that any third party wishing to publish a translation must obtain permission from the author of the article in its original language and also from the translator. If also he wishes to reproduce a published translation by a copying method he would also need permission from the publisher who holds the typographical copyright.

Examples of translation into material form without permission of the copyright-holder, exist, and it is advisable to check this. The fact that the original author of an article to be translated into English is of another country, makes no difference as that country probably has protection under international copyright law.

Whitford is silent on translations and evidently considers the existing terms of the Act as adequate.

7.4. Abstracts

Abstracts made from original works do not infringe copyright. There is on copyright in the titles and the abstract itself is not an adaptation as defined by the Act, and making it is therefore not a restricted act. It is in fact a newly creative act where the creator holds the copyright in the abstract, which, without license, should not be copied outside the regulations, at least without acknowledgement of the source.

7.5. 'Fair dealing'

The concept of 'fair dealing' is to be considered relative to certain exceptions to infringement; the Act does not define the term.

'Fair dealing' with copyright work is allowed for certain extracts, including their uses for the following purposes:

a Research.
b Private study.
c Criticism or review when accompanied by sufficient acknowledgement (defined in Glossary).
d Reporting current events in newspapers or magazines, accompanied by sufficient acknowledgement.
e Judicial proceedings.
f Reading in public of a reasonable extract, with 'sufficient acknowledgement' (not applicable to broadcasting).
g In a collection for schools, under qualifying conditions.
h a–g, in respect of an adaptation of the work (e.g. a translation).

For the purpose of a quantitative definition, the joint statement of the Society of Authors and the Publishers Association is usually quoted. This has no legal sanction, but is a guideline, and is representative of copyright holders who are members of those two bodies.

The following are interpretations by the Society of Authors and the Publishers Association of limits in 'fair dealing' which are satisfactory to these bodies; the high limits apparently reflect the levels below which authors and publishers would not wish to be bothered with requests for permission to copy.[45] The legal interpretation may be quite different, and one can only estimate a position by studying Court cases based on the question of 'substantial part' (this report, 7.6.).

For research and private study, one copy may be made not exceeding 4,000 words, or a series of extracts not exceeding 8,000 words altogether in which no single extract exceeds 3,000 words, provided that the total amount copied does not exceed 10 per cent of the whole work. This applies as a guide also to the rule of 'reasonable proportion' in the Libraries Regulations.

For criticism and review, one extract may be up to 400 words or a series of extracts not exceeding 800 words altogether in which no single extract exceeds 300 words.

7.6. 'Substantial part' of a work

According to Section 49(1) of the 1956 Act, reference in the Act to a work and subject matter of an article includes also the meaning of a 'substantial part' of them as applied to the various restrictive acts. There is also a note to the effect that for the purpose of certain provisions in the Act, the use of a 'substantial part' has no connection with publication as applied to the complete work. It is necessary to attempt to summarize what is meant by 'substantial part', which Whale[8b] says, has already been considered in the Courts, and has been taken not to refer to *quantity* but *essence*. It therefore seems that, for example, it might not be a restrictive act, outside the 'fair dealing' provisions, to quote, for what it is worth, a considerable amount of authors' introductory material, minor experimental details, generalities, etc.; but that it might be restrictive to give excerpts, even if short, of essential parts. It is obviously a difficult question when one has to cast a qualitative eye over a work before deciding what can be quoted from it. A memorandum[20] states that the quality of the part quoted and its value to the user must be considered, as well as its length, in determining what is 'substantial' (four lines from a thirty-two-line poem have been held to be 'substantial').

Whitford[4h] has had various submissions on this question, but has not attempted to recommend closer definition, and 'wishes to avoid inserting a series of definitions, each applicable to a different class of works or subject matter'. Unfortunately it seems, having skated around this matter, which will no doubt place the burden on the Courts to determine what is a 'substantial part', if there is no such series of definitions, Whitford then proceeds to recommend that, in any new Act of Copyright, it will constitute infringement for publication purposes if a 'substantial part' is reproduced and made available to the public. Therefore he has refused to recommend a statutory definition as needed by many, including apparently the Open University, which uses an amount of quoted material in its publications. The Publishers Association thought, however, that the retention of 'substantial part' would be more elastic and leave more room for negotiations (presumably those negotiations in which advantages to the publishers themselves are emergent).

7.7. *Cautionary*

The following cautions are typically found in published works:

> 'No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior permission of the copyright owner'.
>
> 'This report may not be reproduced in part or in whole without prior written consent'.

Since cases of infringement of copyright interests would be dealt with under the 1956 Act, the exceptions of infringement given in that Act apply, and one is under no legal obligation to take the above statements literally, so long as the sections of the Act are observed. For example, one could legally quote an extract for critical purposes or review purposes which would then perhaps be published in another journal, without obtaining prior permission to do so; or a 'reasonable proportion' of a textbook can be copied by a librarian for an individual under the Copyright (Libraries) Regulations.

Nevertheless it is better to be cautious, and to err on the side of obtaining permission, especially when working outside the 'fair dealing' provisions or the above regulations; and especially where the important parts of technical reports are concerned, in all doubtful cases where Government work is being quoted, and in many cases of verbatim use of texts. It is almost always essential to obtain permission to reproduce for publication a photographic illustration unless part of a periodical article being copied under the copying exception; similarly for original line drawings.

8. Crown copyright

8.1. Outline of present arrangements

This form of copyright is dealt with in Section 39 of the 1956 Act and refers to works made by or under control of Her Majesty or a Government Department. Copyright vests in the Crown, an impersonal name for the Queen. It must not be forgotten that service with Government departments is, more accurately, service under the Crown. The special things to note are:

a Even if the author making a work as above is not 'qualified' (see Glossary), then the work is still protected as Crown copyright.

b The rights of the Crown in respect of its copyright are not normally enforced in the case of major public documents (Acts, Bills, etc.);[21] however, papers of Government Departments and Ordnance Survey maps (see Section 8.2. of this report following) are.

c Duration of copyright is perpetual for unpublished literary works (made under the direction and control of the Crown), and fifty years after publication

d Unlike an undertaking without the above governmental connections, copyright is not vested in the various 'employers' or heads or directors of the departments, but in the Crown as generic employer.

e By agreement, a Government Department may transfer copyright to the author, so that it is no longer vested in the Crown.

f Use, where there are no exceptions, of Crown material depends on permission from the HMSO representative and subsequent acknowledgement of source and the granting of the permission by the Controller of Her Majesty's Stationery Office.[21]

8.2. Ordnance survey maps and publications

Permission is needed to reproduce an extract of Ordnance Survey mapping or any map based on Ordnance Survey material, except when the map is over fifty years old from the date of making it and is out of copyright. Copyright in OS material other than mapping is in perpetuity while unpublished and lasts fifty years from publication. Permission is normally granted for:

a Any redrawn map at a scale 1:100 000 or smaller.

b Any redrawn street plan.

c Any facsimile copy of an extract of an OS map which does not exceed 700 square centimetres at the scale of 1:25 000 or smaller and 1250 square centimetres at all scales larger than 1:25 000.

Some further details as given[22] are summarized below:

d In other cases than a–c, permission would depend on the effect of the proposed publication on OS marketing and satisfactory negotiations.

e All reproductions of parts of OS maps should bear the legend 'Crown Copyright Reserved'. There are longer forms of acknowledgement probably needed for reproductions over 200 square centimetres.

f According to the degree of facsimile mapping and other factors there are four categories of copying (each of which attracts its own scale of royalty fees needed per copy reproduced) and three methods of payment.

g Published OS maps are identified by the map footnotes which also include 'Crown Copyright' and a date.
h The National Grid is itself Crown Copyright but may be used without further reference to OS provided the following acknowledgement is given—'The grid on this map is the National Grid taken from the Ordnance Survey map with permission of the Controller of Her Majesty's Stationery Office'.
i The address for enquiries and permission as needed is: Copyright Branch, Ordnance Survey, Romsey Road, Southampton, SN9 4DH.

For the purpose of using OS material in published reports, a research establishment would be classed as a publisher and OS Leaflet No. 23 would apply. The Survey, however, distinguishes between the use of such material by publishers and by users, such as when reproduction is needed for internal purposes, and the literary vehicle is not to be placed on sale or distributed free to the public. In this case another leaflet[23] applies, showing another scale of royalties payable and giving another set of regulations geared to the licensing of use of material for the above purposes. Standard licenses with different terms and conditions are issued to various categories of customers, including specialist activities, various professions, and business firms. Section 10 of the leaflet makes the point that the Fair Dealing Provisions of the Copyright Act (use for private study, research, criticism, review) are interpreted as meaning, in the case of maps, that permission is not needed for making up to four copies of an extract of up to 700 square centimetres.

In general the spirit of the OS rules for publishing their material is concerned with atlas publishers and publishers of text and guide books operating on long runs; and since in many cases the maps sell the publication, it is logical to expect a royalty-fee system to be imposed by the copyright holders. Considering that their Application Form OS.83 for permission to reproduce has nineteen subsections needing replies, some of which are to enable OS to decide which of four copying categories should be applied in order to calculate fees, the system seems needlessly complex especially when the primary aim of publication is often to get out research results rapidly to the public and to other research workers for the benefit of the work alone and not at all for monetary gain.

Without the details in the various licenses it is difficult to generalize; no doubt a degree of blanket-licensing obviates repetition of permission requests, but much overhead time seems needed on calculations based on areas of mapping, together with additional calculations when there is enlargement or reduction.

8.3. Whitford on Crown copyright

Whitford recommends the ending of the special Crown copyright provisions and recommends treatment of the Crown as an employer in the same way as any other employer. Thus copyright in works made by Crown servants would vest in the Crown as employer as if they were serving under any commercial contract of employment conditions. Obviously Whitford considers 'direction and control' as a wide net by which the Crown can secure copyright in works in which a large amount of independent detailed work has been done by outside bodies and would not be so secured if such bodies had been asked to do work by an employer other than the Crown. For instance, if the Crown 'directs and controls' a conference in which papers are submitted from outside, a collection of such papers is Crown copyright; whereas for a non-Crown employer or organizer, papers from outside carry copyright in favour of the author-body unless legally assigned to the organizer.

The Whitford Report is unequivocal in what is wanted, and quotes that certain Government departments claim copyright in computer programs where the program has been devised outside to answer their problems, thus denying the programming company the right to re-use the program information, for example, to adapt it to another program.

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GLOSSARY

ARTISTIC WORK For this article, the selective list is photographs, diagrams, maps, charts, plans.

COPYING In the sense of the copyright laws, making single or multi-copies of an original, including making it in some other form (*e.g.* translation).

COPYRIGHT The exclusive right given by law for a certain term of years to an author, composer, etc. (or his asignee) to print, publish, and sell copies of his original work. (The original meaning of the term was 'the right to copy'—this report, Section 2.)

FAIR DEALING See this report, Section 7.5.

PUBLICATION a A literary, dramatic or musical work, or an edition of such work, or an artistic work, shall be taken to have been published if, but only if, reproductions of the work or edition have been issued to the public (1956 Act, Section 49, 2c).

b Gratuitous outside circulation would constitute publication in general, but private circulation has been held not to constitute publication (Copinger and Skone James).

c If a work is 'published' without permission of the copyright owner, then this does not constitute publication (Copinger and Skone James).

d Sending out review copies does not constitute publication (Copinger and Skone James).

e After USA Act only: Distribution of copies of work to the public by sale or other transfer of ownership or by rental, lease or lending. Offering to distribute copies to a group for redistribution also constitutes publication.

QUALIFIED PERSON This phrase occurs in several places in the 1956 Act in connection with a person who 'makes' a work and is a condition for the subsistence of copyright in that work. A person is qualified if he can be classed as a British subject or British protected person or citizen of the Republic of Ireland, or as domiciled or resident in the UK or in another country to which the Act extends. The meaning extends to a corporate body in the UK under its laws (or such a body of another country to which the provisions of the Act extend).

REPROGRAPHIC REPRODUCTION The making of any visually perceivable facsimile copy of literary works (after Whitford, Section 211).

SUBSTANTIAL PART OF THE WORK See this report, Section 7.6.

SUFFICIENT ACKNOWLEDGEMENT For the purpose of the copyright laws, an acknowledgement identifying the work in question by its title or other description and also identifying the author (unless the work is anonymous or the author has agreed that his name need not be mentioned) (after 1956 Act, Section 6, 10).

Inter-library loans analysis for journals acquisition

Peter Thorpe

Hoechst Pharmaceutical Research Laboratories

HOECHST PHARMACEUTICAL RESEARCH LABORATORIES (HPRL) were officially opened on 4th July 1974 and initially limited to certain specific research fields. The initial list of books and journals for the Library was compiled and purchased by a senior member of the research staff in consultation with potential users and colleagues within the industry before the appointment of the Technical Librarian/Information Officer in August 1974. Consequently, one of the first major tasks necessary was an evaluation of the usefulness of the journal titles ordered, and an assessment as to whether or not additional titles were required.

The rather broad interests of the various departments involved at HPRL made it difficult to predict a list of relevant journals, so it was decided to wait until a reasonable number of inter-library loans forms had accumulated before recommending any major changes in the journal subscription list. Since all requests for pre-1974 material had to be met by inter-library loans, it was considered that an analysis of these loans would give a good indication of the journals relevant to HPRL, provided two other points were also taken into account. First, a number of publications of the newsheet or newspaper type are of considerable importance for current in-library use, but are seldom if ever consulted retrospectively. Perhaps some of the more academic journals are used in a similar way by some user populations? Since this seemed a valid argument a separate in-library usage survey was carried out during September 1975 and the results compared with the results of the inter-library loans analysis. A second point to be kept in mind is that of new journals. A journal which has existed for only two or three years cannot be expected to do as well in a loans analysis as a long-established title. It was decided that if a journal was five years old or less, and it subjectively seemed relevant to one or more HPRL departments, then a subscription should be maintained, regardless of the title's position in the loans analysis.

A related point which ought to be raised here is that of productivity. This results from the fact that some journals, for a variety of reasons (*e.g.* they are thicker, they contain short papers rather than long ones, they appear frequently), are much more productive in terms of total number of articles available for requesting than other journals. Consequently, there is a marked tendency for these more productive journals to appear higher on lists of frequently borrowed, or frequently cited, titles. Whilst this factor must be taken into consideration when compiling lists of the most important journals (or the 'core' journals) with a subject area, it was not included in the present study. It was considered

Aslib Proceedings, 31 (7), July 1979, p. 352–359. Printed in Great Britain

that the Library would, if faced with a choice, subscribe to a 'popular' productive journal rather than to an equally 'popular' but less productive one. Similarly, the related cost of the journal subscriptions were not used in the analysis. The study was not done primarily fór reasons of economy, but rather to provide Library management with a simple check, to confirm that the journals being bought were in fact the ones most in demand in the real life situation.

Method

Inter-library loans analysis

Inter-library loans forms representing twelve months' requests (September 1974–August 1975) to the British Library Lending Division (BLLD) were analysed. Three sets of data were recorded on cards for each loan record: (i) Journal title and year of publication requested; (ii) Name and department of the person requesting; and (iii) Date (*i.e.* month) the request was made.

In-library usage

A form, inviting library users to tick under various headings when they removed the journal issue, was fixed under each current issue displayed in the Library during September 1975. This form attempted to collect information regarding the number and nature of in-library 'usages' and the department using, for each current title.

Results

Inter-library loans analysis

During the period studied there was a total of 993 requests made to BLLD for 356 journal titles. The most popular title, *Journal of Pharmaceutical Sciences*, was requested sixty-six times, whilst at the other extreme, 193 titles were only requested once. Full details are given in Table 1. Table 2 gives a list, in rank order, of the top forty-nine titles (*i.e.* those titles which were requested five times or more).

The data were then used to construct a bibliograph as described by Brookes,[1,2] which is shown in Figure 1. This graph is drawn on semi-log paper with the cumulative use (productivity) of the periodical population (P) on the linear scale, against the productivity of individual titles (p), making up the population P, ranked in descending order of use, on the log scale. The 'core zone' (C marks the end of this zone on the graph) was found to consist of twenty-nine titles which together provided 41.24 per cent of the inter-library loans requests.

The other sets of data collected provided useful library management information regarding departments' and individuals' use of the library, and seasonal variation in Library usage.

In-library usage

The data obtained from this survey were weighted to take into account the differing frequency of publication of different journals. Since the questionnaire was displayed behind each current journal in the Library for a one-month

CUMULATIVE TOTAL OF NUMBER OF TITLES	CUMULATED % OF TITLES	CUMULATED TOTAL OF REQUESTS	CUMULATED % OF REQUESTS
1	0.28	66	6.72
2	0.56	107	10.89
3	0.84	131	13.34
4	1.12	152	15.47
5	1.40	168	17.10
6	1.68	182	18.53
10	2.80	234	23.82
13	3.65	270	27.49
16	4.49	303	30.85
20	5.33	333	33.91
23	6.17	360	36.65
26	7.02	384	39.10
29	7.86	405	41.24
39	10.95	471	47.96
49	13.76	521	53.05
57	16.29	557	56.72
91	25.56	656	66.80
163	45.78	800	81.46
356	100.00	993	100.00

TABLE 1: *Inter-library loans analysis. The* 356 *journal titles requested produced a total of* 993 *requested articles. The 'core zone' of twenty-nine titles (i.e.* 7.86 *per cent of the total titles) satisfied* 405 *(i.e.* 41.24 *per cent) of the requests.*

period, a weekly title could expect to collect more 'usages' than a monthly. To counteract this tendency a 'usage co-efficient' (K_u) was introduced:

$$K_u = \frac{N_u}{N_i}$$

where, N_u = number of 'usages' recorded for a title, and
N_i = number of issues of that title received during the survey period. (If no issues were received during this time, then N_i was taken as one.)

Table 3 gives a list of the top fifty-four journals in the in-library usage survey (*i.e.* all the titles with a usage co-efficient, K_u, of two or more). Asterisks indicate titles which appear in this list but not in Table 2. A comparison of the two tables (2 and 3) shows that there is a considerable difference between the titles consulted in the library and those requested on inter-library loan (even taking into account current issues requested on loan because they were unavailable in the library). Many of the titles on the in-library usage list (Table 3) are of the general or news type, *e.g. Scrip*, *New Scientist*, *Nature*, *Scientific American*, whilst others are titles which commenced fairly recently, *e.g. Journal of Pharmacokinetics and Biopharmaceutics*, *Drug Metabolism and Disposition*, *Drugs*. However, the survey also indicates that many well-established primary journals were being scanned in the library, even though they were not an important source of requested articles.

RANK NO.	JOURNAL	NO. OF REQUESTS
1	*Journal of Pharmaceutical Sciences*	66
2	*Journal of the American Chemical Society*	41
3	*Journal of Biological Chemistry*	24
4	*Journal of Pharmacology & Experimental Therapeutics*	21
5	*Biochimica Biophysica Acta*	16
6	*Journal of Clinical Investigation*	14
7	*Biochemical Pharmacology*	13
	Clinical Chemistry	13
	Journal of Obstetrics and Gynaecology	13
	New England Journal of Medicine	13
11	*Acta Pharmacologica et Toxicologica*	12
	American Journal of Obstetrics and Gynecology	12
	Journal of Organic Chemistry	12
14	*Biochemical Journal*	11
	Clinical Pharmacology and Therapeutics	11
	Journal of Pharmacy and Pharmacology	11
17	*Arzneimittel-Forschung*	10
	Journal of Clinical Endocrinology & Metabolism	10
	Journal of Laboratory and Clinical Medicine	10
	Nature	10
21	*Aerosol Age*	9
	American Journal of Physiology	9
	Annual Reviews of Pharmacology	9
24	*Clinical Biochemistry*	8
	Journal of the Chemical Society (all parts)	8
	Medical Journal of Australia	8
27	*Biochemistry*	7
	Life Sciences	7
	Proceedings of the Society for Experimental Biology and Medicine	7
30	*Analytical Biochemistry*	6
	Archives of Biochemistry and Biophysics	6
	British Journal of Clinical Pharmacology	6
	Chemical and Pharmaceutical Bulletin	6
	Helvetica Chimica Acta	6
	Journal of the American Medical Association	6
	Journal of Chromatography	6
	Science	6
	Soap and Chemical Specialities	6
	Tetrahedron Letters	6
40	*Analytical Chemistry*	5
	Annals of the New York Academy of Sciences	5
	Antimicrobial Agents and Chemotherapy	5
	Archives of Internal Medicine	5
	Archives Internationales de Pharmacodynamie	5
	Cosmetics and Perfumery	5
	Comptes Rendues de l'Academie des Sciences, D	5
	Pharmacological Reviews	5
	Pharmazeutisches Industrie	5
	Steroids	5

TABLE 2: *Inter-library loans analysis. Top forty-nine journals in the rank order list showing each journal's position in the list and the number of times it was requested during the twelve-month study period.*

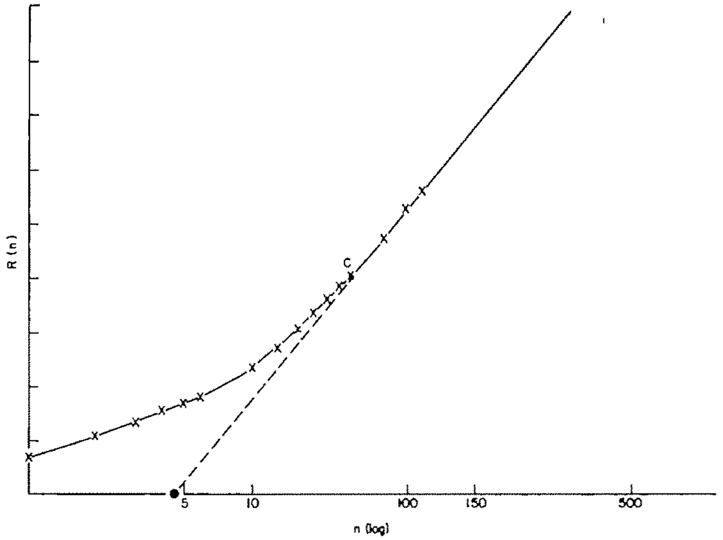

FIG. 1: *Bibliograph based on one year's inter-library loans data. R(n) is cumulative total of requests, n is rank order number and C marks the end of the 'core zone'.*

The information collected on the age of the items requested on loan was also analysed in an attempt to provide some guidance on what size of back-files to obtain or maintain for which titles. The much discussed inverse relation between age and number of times requested was again apparent. Figure 2 shows the distribution of the total number (993) of inter-library loans according to date of publication. Each journal title was also allocated to a broad subject field and the age distribution of loans within these subjects examined. A marked difference in half-life between the biomedical sciences and the chemical sciences was noted. Figure 3 shows age distribution of loans within six subject fields of interest to the pharmaceutical industry. From these data it was tentatively recommended that back-files in biology and medicine should be acquired for the most important titles from 1970 to date. Back-files in chemistry, on the other hand, should cover a much longer period (twenty years and more).

Discussion

The use of inter-library loans and journal usage statistics in the development of subscription and back-file policies has been discussed by a number of authors.[3-10] A surprising finding by Graziano,[4] working in a large university science library, was that the chance of a title being requested more than once was largely accidental, and that therefore such an analysis was of limited value as a selection aid for specific titles. Certainly, the results obtained at HPRL do not corroborate this finding. It seems likely that the differences may be due to the very different environments in which the two studies were carried out, since results obtained by Dillehay *et al.*[7] in an established industrial library show the usefulness of such a study. A problem raised by both Vickery[6] and O'Neill[8] is that of quantifying the in-library use of journals. As HPRL was a new library we had a great advantage here in that in-library use of back-file primary material

RANK NO.	JOURNAL	USAGE CO-EFFICIENT K_u
1	*Journal of Pharmacokinetics & Biopharmaceutics*	7
2	*Clinical Chemistry*	6
3	**New Scientist*	5·4
4	**Drug Metabolism and Disposition*	5
5	*Clinical Pharmacology and Therapeutics*	4
	**Harvard Business Review*	4
	**Health Physics*	4
	**Hospital Equipment and Supplies*	4
	**Journal of Chromatographic Science*	4
	Journal of Chromatography	4
	Journal of Pharmacy and Pharmacology	4
	Lancet	4
	**Scientific American*	4
14	*British Medical Journal*	3·5
15	*Nature*	3·4
16	*Acta Pharmacologica et Toxicologica*	3
	**American Journal of Hospital Pharmacy*	3
	**Analyst*	3
	Analytical Chemistry	3
	**Chemico-biological Interactions*	3
	**Drugs*	3
	**European Journal of Clinical Pharmacology*	3
	**Management Today*	3
	**MIMS*	3
	Pharmazeutisches Industrie	3
	**World Medicine*	3
27	*Science*	2.5
28	*Journal of the American Medical Association*	2
	Analytical Biochemistry	2
	**Archives of Pharmacology*	2
	**Journal of the Association of Official Analytical Chemists*	2
	Biochemical Journal (*Cellular Aspects*)	2
	Biochemical Journal (*Molecular Aspects*)	2
	**Chemical Reviews*	2
	Biochemical Pharmacology	2
	**Business Administration*	2
	Journal of the Chemical Society (*Perkin* 1)	2
	Journal of the Chemical Society (*Chem. Comms.*)	2
	**Clinica Chimica Acta*	2
	**Fortune*	2
	**FEBS Letters*	2
	**Immunochemistry*	2
	**Immunology*	2
	**Journal of Clinical Endocrinology & Metabolism*	2
	**Journal of Clinical Pharmacology*	2
	Journal of Pharmaceutical Sciences	2
	Journal of Pharmacology & Experimental Therapeutics	2
	**Manufacturing Chemist*	2
	**Neuropharmacology*	2
	**Bulletin of the Parenteral Drug Association*	2
	**Protection*	2
	** Scrip*	2
	Proceedings of the Society for Experimental Biology & Medicine	2
	Steroids	2

TABLE 3: *In-library usage. Top fifty-four journals in the rank order list showing each journal's position in the list and its usage co-efficient* (K_u) *based on one month's survey. Titles marked * are those which do not appear in Table* 2 (*i.e. the top forty-nine titles in the inter-library loans analysis*).

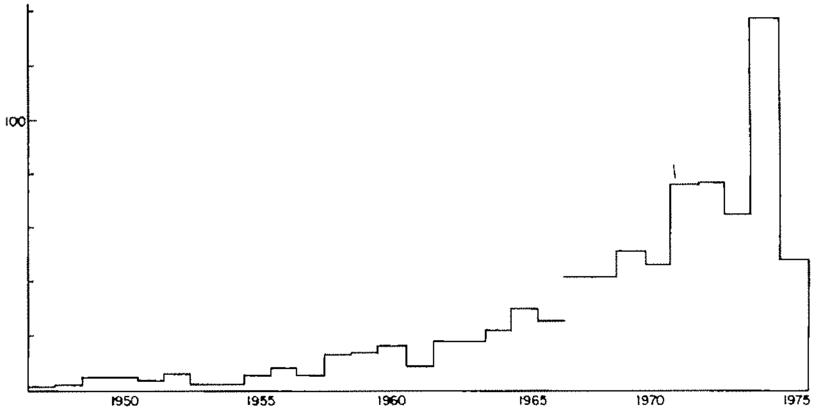

FIG 2: *Inter-library loans analysis. Age distribution of requested items during one year study period.*

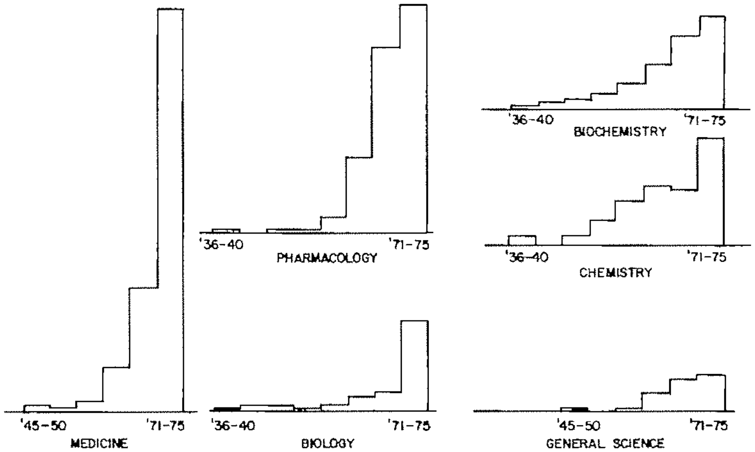

FIG 3: *Inter-library loans analysis. Age distribution of items requested in various subject areas, during the one year study period.*

was virtually nil, so that the entire usage could be measured via inter-library loans records.

Even though the subject area being analysed was rather diffuse it was thought worthwhile attempting to construct a bibliograph, so that a 'core zone' of titles could be defined. These titles were then used as the basis for a back-files acquisitions policy. In fact, the 1976 subscription list was built up from these twenty-nine titles, plus the next twenty on the list which together produced 50 per cent of the requested items (Table 2). Another thirty-two titles (those asterisked in Table 3) were selected from the in-library usage study. A number of other new or recent titles were also ordered since they seemed subjectively appropriate to our needs. As a direct result of the analysis, fifteen additional titles were ordered and eight were cancelled. The study appeared to have fulfilled its aims of providing useful recommendations based on recorded usage of the stock of the library. The findings regarding current journal usage were immediately of value in building up the 1976 subscriptions list. The suggestions regarding back-file acquisition will be utilized and re-examined as the library develops.

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BRIEF REVIEWS

HERDMAN, MARGARET M. Classification: an introductory manual by Margaret M. Herdman. 3rd ed. revised by Jeanne Osborn. Chicago, ALA, 1978. 44 pp. £3.50. (ISBN 0 8389 0277 4.)

This is a good, short book covering the basics of library classification. Chapters include: shelf arrangement; notation; classification history; individual schemes (DDC, UDC, LC and Colon); book numbers; principles and rules for classifying books; choice of classification scheme. There is a seven page bibliography.

MORTON, LESLIE T. How to use a medical library. 6th ed. London, Heinemann, 1979. 118 pp. £2.95. (ISBN 0 433 22451 7.)

The last edition of this book came out in 1971 and the new edition has an extra chapter on audiovisual aids in medical libraries. Other chapters are on the same subjects, that is: principal indexes to medical literature; abstracting services; literature searches; compilation of bibliographies; basic reference works; pharmaceutical literature; historical sources; biographical sources; medical libraries in Britain; arrangement within the library; periodicals. This is still a good introduction to medical librarianship and would be useful to students of librarianship in general.

ROBERTS, STEPHEN *and others, comps.* Research libraries and collections in the United Kingdom: a selective inventory and guide compiled by Stephen Roberts, Alan Cooper and Lesley Gilder. London, Bingley, 1978. 285 pp. £11.50. (ISBN 0 85157 258 8.)

This directory is aiming to offer 'a useful general package of information about research libraries and collections in the United Kingdom'. The inventory itself is divided into four sections: national libraries, specialist libraries and public libraries; university libraries; polytechnic libraries in England and Wales; Scottish Central Institutions. There are four indexes: subject; name; geographical; and list of libraries. The library given in the index as holding material on information science is the Library of the Public Record Office. The libraries listed for librarianship are the Library Association Library, Manchester Public Library, National Book League, University College Library, Sheffield University Library and the Andersonian Library at Strathclyde. (There is no listing of the Aslib Library for either information science or librarianship!) Unfortunately the compilers do not indicate what their criteria for the selection were other than to select libraries to which the user can gain access fairly easily.

WILLIAMS, PATRICK *and* PEARCE, JOAN THORNTON. The vital network: a theory of communcation and society. London, Greenwood Press, 1978. 111 pp. £9.50. (ISBN 0 313 20324 5.) (Contributions in Librarianship and Information Science no. 25.)

These authors aim to provide a 'theory of macrocommunication systems', a theory to account for the functions and importance of the communication systems that are most important to human social life. So Chapters 1 and 2 analyse and discuss macrocommunication systems that create and sustain human social life with a special emphasis on American society. Chapter 3 applies this theoretical understanding to the activities of American communications professionals. In the epilogue the library profession in America is seen as an essential part of the democratic and libertarian principles fundamental to American social life in its role as provider of an information resource accessible to everyone without charge, controlled by no private interest and constrained by no orthodoxy.

Letters to the Editor

FUTURE PERFECT

In his paper 'Future perfect' (*Aslib Proceedings*, 31 (4), April 1979, p. 158–69), Wilfred Ashworth expounds with his usual clarity a point of view to which I adhered for over two decades while working in industrial concerns. Nevertheless, while I remained convinced that the principles upon which this point of view is founded must be applied by the library and information services supporting clearly defined communities, I am not altogether sure that these principles can be extended to the library function in society generally.

The active band of knowledge required by society today merely to operate and develop in sensible ways is probably so wide that it is difficult if not impossible to distinguish it from the totality of recorded human knowledge. If human society or any part of it confines its attention to the current active band of knowledge then disaster is assured unless a considerable proportion of society's efforts are devoted to continuously rediscovering the technology of the wheel or whatever ignored or discarded knowledge is required. Nor should it be forgotten that many of our techniques have developed over the centuries and past approaches may well be pertinent to today's problems. (I am reminded of this by recent studies concerning 'oxide jacking'.)

Thus it seems to me that, while accepting that stocks of literature held by libraries supporting particular communities must be limited in some way, librarians as a professional group must develop much more effective mechanisms for collecting and storing the maximum quantity of recorded knowledge, vastly more efficient means for assessing that knowledge and spectacular improvements in making the packets of knowledge available to individuals in all parts of our society. Present difficulties, real and imagined, must not persuade us to abandon our professional ideals for what is, after all, a form of censorship because that is the easier approach. Thus I hope that if we have a British national co-ordinating body for all library services the members of that body will bear in mind the point that perfection is achieved only in pursuit of the apparently unattainable.

RICHARD HINDSON
Hindson & Partners
Bridport

MICROPROCESSORS

As a result of errors by at least two people, compounded by postal problems, the second page of the article on 'The potential of the microprocessor in library and information work' in the April issue of *Aslib Proceedings* was not published as the author intended. Page 203 should be read in the light of the following comments which are, hopefully, a clearer statement of the current position on microcomputer storage.

The cheaper microcomputer systems for the non-expert user have 4K bytes of main storage, with better versions having 8K, 16K, 24K, 32K, or 48K bytes of storage. The limit of addressable storage is 64K bytes, or approximately 512,000 bits, on these machines at the present time.

The storage memory chips which are standard at the moment are composed of units of 16K bits (2K bytes) but the 64K bit (8K byte) chip is now available. Forecasts are for a 256K chip by 1980. To simplify the figure K was taken as 1,000 whereas the exact figure is 1,024.

PHILIP W. WILLIAMS
Computation Dept.
UMIST

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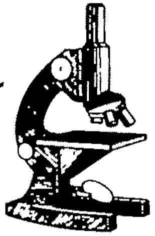

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Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, Kathleen Gray, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

Why educate the library user?

Ray Lester

Librarian, Queen Elizabeth College, University of London

Paper presented at an Aslib Evening Meeting, Aslib, 25th April 1979

MY AIM IN this paper is to try to engage you in a critical evaluation of some present practice in 'library user education'. The discussion is in three parts:

(a) First, I need to discuss the nature of information, or more particularly that type of information we call *knowledge*, relating that to the nature of the *user*.

(b) Against that background, I then consider the *formal* courses of library user education which have been developed in educational institutes in recent years, hoping to show that, in general, they are quite inappropriate.

(c) Finally, I try to define what I see as the proper role of librarians *vis-à-vis* the library user.

Public knowledge and private ignorance

It would be a tall order indeed, in a relatively short paper, to try to say something cogent on the nature of knowledge and its relation to the actual or potential library user, if I were not able to call upon what seems to me a fairly authoritative survey of the field. My text is Patrick Wilson's *Public knowledge, private ignorance: towards a library and information policy*,[1] and this section attempts to summarize Wilson's reasoning. Necessarily, I can present no more than the barest outline of what is a detailed and wide-ranging argument, to which I trust that I have been faithful.[2]

As the title of the book suggests, the discussion is in three sections: public knowledge, private ignorance and libraries. In his first section, Wilson is concerned to establish that only an expert within a particular subject field is able to assess whether statements within documents appertaining to that subject field, are faithful descriptions of what is known; that these statements contribute to *public knowledge*. 'Public knowledge' is defined as 'the view of the world that is the best we can construct at a given time, judged by our own best procedures for criticism and evaluation of the published record'. I quote from the book:

> 'The tasks of saying what is known about some aspect of the world, of answering minute particular questions about public knowledge, and of saying that a new survey is accurate, or an old survey is still accurate, all call for the same qualifications: those of the practitioner in the field that is responsible for the particular area of knowledge. The outsider is always free to assert his own judgement and to disagree with the insiders, and if enough outsiders disagree with the insiders, the insiders may lose their position. But as long as the group (of '*insiders*') retains its socially granted authority, those who recognise this authority will accept no other judgement as having weight, unless it is the representative of a group having a more firmly established grant of authority.'

Aslib Proceedings, 31 (8), August 1979, p. 366–380. Printed in Great Britain

Very few of us (librarians or not) can in any sense be *insiders* for more than a fraction of the subject areas that concern or interest us in our lives. Perhaps, then, the answer for those areas in which we find ourselves *outsiders*, is to be able to consult a great encyclopaedia, which would be a complete written representation of 'public knowledge'—the ultimate reference work. This thought leads to Wilson's second main point:

> 'Acquiring knowledge is acquiring understanding, and only those who can understand what is said in the encyclopaedia can be said to acquire the knowledge it represents. But this commonly depends on what one already knows: what is quickly and easily grasped by one with a certain sort of prior learning is slowly and laboriously grasped, or not grasped at all, by those without comparable learning.'

We can distinguish two main factors at work here: the first is our own innate ability to understand; and the second the time, effort and money we are prepared, or are able, to devote to understanding. In the second section of his book, 'Private Ignorance', Wilson focuses on the second factor. He asks us to recognize the reality of each human being's information situation (and, in a library context, the reality of the library user's situation). He discusses the complex nature of personal information systems; he illustrates the tremendous diversity in people's interest and concerns; and he stresses how 'questions of the distribution of knowledge in society touch immediately on profound questions of the whole social, political and economic organisation of society'—I shall return to this point at the end of my paper. Against the background of this extreme complexity and diversity, each of us—actual or potential library users—pursues information, either by desire, or of necessity. But:

> 'No-one pursues information to the exclusion of all other activities; life would soon stop if one did. In the first place, maintenance of an information system is costly; it uses up time, effort and money. In the second place, there are limits to our ability to understand and use the information that could be got if we took the trouble. In the third place, we can have enough—enough useful information to satisfy our wants, and enough interesting information to sate our appetites.'

Furthermore, Wilson argues (and this is the crucial point for librarians) if, despite this reality, as users, we find that we desire, or have to obtain, information:

> 1. We will prefer to rely on advisers rather than to accumulate education that will enable us to comprehend, and experience that would enable us to apply, information in the adviser's field of competence.
> 2. We will prefer sources that adapt to our needs over sources to which we must adapt ourselves.
> 3. We will prefer sources of specialized knowledge organized in such a way as to correspond to our areas of concern over sources not so organised.'

And, I would add, if we cannot get to any of these, only then will we try an academic or public library. The mere matching of our information needs to *potentially* relevant information—which is the most that academic and public libraries, as distinct from special libraries, can normally do—is no guarantee that we will be able, or will want, to use such information to solve our problems.

> 'There is no way in which we can acquire knowledge without effort. If we cannot or will not make the effort, then the only way in which we can have the advantage of knowledge is by taking advice rather than instruction.'

Against that sort of background, Wilson goes on in the third section of his book to discuss whether (non-specialist) academic and public libraries should try to develop themselves into specialized information centres. If the majority of library users are more often than not unable or unwilling to convert information into knowledge, to aid their 'decision making', what role for such libraries? I shall be concerned with that topic in the third section of this paper.

Formal courses of library user education

But now I want to look specifically at academic libraries where, complementary to attempts to provide specialized information services, there has developed a desire, often indeed a passion, for formally educating students in library use. Notwithstanding the nature of knowledge and the nature of the user, as outlined above, the implicit assumption perhaps has been that the students of educational institutions are, by definition, both able and willing to convert information into knowledge, at least in their specific chosen subject field. Because the library is an important source of such specific information it is clearly appropriate that students appreciate how libraries fit into the general communication framework.

The advocates of library user education, however, have in fact chosen a much wider canvas, as is well brought out in the recent book by Nancy Fjällbrant and Malcolm Stevenson.[3] They summarize the reasons for educating the library user:

(a) Firstly, as a matter of *general principle.*

> '(To) know how to use a library (is) an essential part of the education-for-life process to prepare the student for the continuing process of self-education once the formal process (has) been completed.'

(Education seen as a continual or life-long process, largely self-motivated.)

> 'The explosion of knowledge places greater stress on the ability to learn throughout life.'

(Growth in the amount and complexity of information.)

(b) Second, because of present *educational practice.*

> 'The emphasis on self-education has led to the increased use of tutorials, seminars, projects and guided reading as teaching methods, and less reliance on formal lectures. There is an implicit assumption in this educational change that the learner is capable of finding material relevant to his needs. In practice, such an assumption is not valid; the learner requires to be taught that capability.'

(Users are not innately capable of finding their way around the mass of information.)

(c) Third, as a reflection of sound *library philosophy.*

> 'As a profession we must stop hoarding our bibliographic knowledge and concealing our awareness of the problem of information retrieval. We must stop waiting to be asked to share this special knowledge. We must insist upon making it available to all users, in every conceivable form, and at every accessible point of need.'

(Librarians have a role in helping users find their way around the mass of information.)

To reduce these three statements to their simplest terms, we may conceive of the *pupil,* you or me, on one side, and *information* on the other side. A major part of education, in general, can be thought of as the process of acquiring the skills necessary for the pupil to choose and use appropriate portions of the total bank of information. Those who advocate life-long education[4] argue that, not only is the structure and detailed content of a total bank of information constantly changing, but also, the relative importance of its various components also changes. This means, for example, that what was chosen to be taught when we were at school or university (and, clearly, there must be a choice) is not what needs to be taught now that our children are at school, or university or polytechnic. Partly for this reason, the emphasis now in education is on *process* rather than *produce*—on the pupil acquiring a capability for learning how to learn, rather than on just becoming learned.

Within that general framework, when we consider library education, we have on the one side the *library pupil*, the actual or potential library user; and on the other side *library information*, its collection of documents. Two similar problems arise when considering library education, as in considering education in general. First, how is instruction in the use of libraries to be spread out throughout our lives: to what extent should it be a life-long activity? Second, what should be the balance between 'process' and 'produce'; between, on one hand, a general consideration of what libraries are and what their place should be in society; and, on the other hand, a detailed consideration of their content and methods?

To these two problems—*when* should instruction about libraries be given, and *what* should be taught about them—within the formal educational sphere, we can add a third problem, *who* should teach about libraries: the librarian, or the lecturer or teacher?

Most library user education in our educational institutions (schools, colleges, polytechnics, universities) at present seems to be based on two assumptions:

(a) That it is the librarian's job *formally* to teach users how to use the library and search for information.

(b) That the *details* of how to use libraries and search for information can, indeed, be formally taught.

I believe these assumptions are wrong; and I hope to convince you that the detailed formal courses of library user education that have been developed by librarians in recent years, particularly in institutions of higher education, are misconceived and should be abolished. I am not arguing here against one-to-one *informal* user education within the library as and when necessary; but against *formal* timetabled courses of lectures given by librarians.

It seems surprising that librarians are still giving and trying to develop courses of user education in relative or complete isolation from their academic colleagues, when the message coming through from all those who have looked seriously at the area has been so clear-cut: *integrate*. Indeed, the first main conclusion of the Final Report of the British Library Research and Development Department *Review Committee on Education for Information Use*[5] was:

> 'The Committee strongly supports . . ("integrated instruction") . . . and adopts the working definition of integrated information studies as "the student getting the information and learning the techniques at the point of use, thus having a genuine reason to practice what is learned".'

That seems to me fairly decisive. The important point is that the student should learn about libraries as part and parcel of his chosen subject study, when he or she will therefore be motivated to find out about something that otherwise seems arid and peripheral. Accepting this, it is clear that it is the academic staff who must be primarily responsible for library teaching. This view has been fully supported by the conclusions of the various BLR&DD Subject Review Committees, part of whose brief was to look at library user education. The *Chemical Information Review Committee*[6] proposed:

> 'One member of the teaching staff within each university or polytechnic chemistry department should be responsible for the training of research students in information techniques and sources.'

The *Biological Information Review Committee*[7] said:

> 'Tuition should not, however, be considered in isolation, but as integral with the developing academic work. Bibliographic instruction can form a natural part of instruction in communication and information. . . .'

And the *Physics Information Review Committee*,[8] whilst reiterating that we should not just be trying to teach 'library use' but 'information use', within the context of a general study of communication, gently chided librarians for being so much 'outsiders' (in the sense I quoted earlier from Wilson's book):

> 'It is desirable that all those who are trained to work in scientific libraries and information units should have a good appreciation of how their work fits into scientific communication as a whole.'

That statement is perhaps only to be expected, when the Chairman of that Committee has such a deep appreciation of the nature of scientific communication, and can forcefully remind us elsewhere:[9]

> 'Ideas move around inside people.'

A second message coming through in recent writings on library user education, in addition to that of 'integration', is that we must start trying to teach information and library use much earlier in life than has been normal. The 'Review Committee on Education for Information Use'[5] quoted the *Bullock Report*:

> 'Dealing efficiently with information must now be recognised as one of the major problems of modern society . . . (a pupil) must be able to identify his own information needs . . . know the sources . . . judge the value . . select the limited amount which will serve him best. . . . Pupils should be led to confidence in the use of bibliographical tools and in tapping sources of information in the community at large.'
>
> 'Every subject teacher in secondary school must assume responsibility for developing all those kinds of skills that are needed by his pupils to read intelligently the material he presents to them.'

Note the emphasis in these two statements not only on integrating library instruction into normal subject teaching; but also again on conceiving of effective and efficient library use as just one aspect, albeit often an important aspect, of the overall problem of information and communication. It seems so often that the advocates of library user education believe that the only, or the best, source of the information needed to answer every imaginable question, is the library.

Occasionally one finds an admission, not necessarily overt, that our user might just be able to obtain the information he or she needs elsewhere. For instance, the American Association of College and Research Libraries has produced some *Objectives for Bibliographic Instruction in Academic Libraries*.[10] They start off fairly well:

> 'T1 The student recognises the library as a primary source of recorded information.
>
> T2 The student recognises the library staff, particularly the reference staff, as a source of information, and is comfortable seeking assistance from staff members.
>
> T3 The student is familiar with (or has knowledge of) the library resources that are available to him:
>
> (a) The student knows what library units exist on his campus and where they are located.
> The student knows what major information resources and collections are available in these units.
>
> (b) The student understands the procedures established for using these facilities.
>
> (c) The student knows about the off-campus information facilities available and how to approach their resources.'

These so-called 'terminal objectives' are each elaborated by a number of 'enabling objectives'. For example, within T1, we have E1: 'Given a list of information needs for services which can best be handled by a variety of campus units, the student correctly identifies the library as the best unit for at least 85% of the appropriate listings' (85 per cent is just a suggested 'good' score). Or E4: 'The student asks the reference staff whenever library-related information is needed.' (The Task Force specifically tried to write these enabling objectives as 'behaviourable objectives'; I particularly like E2: 'The student can identify the members of reference staff by sight *and* locate their offices'.)

Once, however, we really get our hands on the students, woe betide them if they don't use exactly the bibliographic tools that they should, in exactly the way that we specify:

> 'T4 The student can make effective use of the library resources available to him:
>
> (a) He knows how to use institutional holdings records (such as the card catalog and serials holdings lists) to locate materials in the library system.
>
> (b) He knows how to use reference tools basic to all subject areas.
>
> (c) The student knows how information is organised in his own field of interest and how to use its basic reference tools.
>
> (d) The student can plan and implement an efficient search strategy using library, campus and other resources as appropriate.
>
> (e) The student is able to evaluate materials and select those appropriate to his needs.'

For example, under T4e, the student is given a topic within his major field of study, and has to compile a 'quality' bibliography, within a specified time. He has to carry out eleven procedures—clearly defining his topic, using alternative search terms, consulting general reference works, looking for existing bibliographies, searching abstracts and indexes, using the card catalogues and so on. And to make sure he does all this properly, he has to keep a diary of each procedure. It is clear that the diary will need to record some considerable detail because, for example, earlier in his course, in learning to use the card catalogues, the student will already have demonstrated his 'knowledge of form subdivisions, and subject filing rules such as historical sub-divisions are filed in chronological order'.

If you are beginning to feel that all this activity (I like the phrase 'pointless busywork') is far removed from the reality of the average student's situation, certainly from that of the user I outlined earlier from Wilson's book, I could not agree more. As Peter Taylor has written:[11]

> 'There seems little point in constructing elaborate tests of knowledge of subject headings, filing rules, and abbreviations, if we know that the majority of students give the catalogue a wistful look and then walk straight past it.'

It often seems that user education librarians have decided that the only way to make up for any lack of subject knowledge is to cram their lectures full of the most intricate details of bibliographical practice. And when the lectures fail (the students fall asleep or just don't turn up) instead of asking whether the whole thing is misconceived—in that most of what they are trying to teach should not be formally taught, and what should be formally taught about libraries and information should not be taught by them anyway—they have decided that it is their method of teaching that is wrong. So we have had a seemingly endless succession of suggestions on improving our teaching. *Perhaps* the students need something concrete to take away from the lectures; *so* we all set about producing guidesheets, factfinders, signposts, how to find out about this, that and the other—so much so that the Information Officer for User Education had to announce in a recent issue of *INFUSE*:[12] 'Such is the quantity of material being deposited in the Library Instruction Materials Data Bank that it is no longer possible to note all of it in *INFUSE*'. Then *perhaps* it is not just a question of producing more guides but better guides; *so* we commission Aslib to survey subject guides to sources of information and recommend improvements. *Perhaps* we should encourage our students to use more of the large published guides to the literature in our libraries; *so* we all set about stocking up, for instance, from the *selective* list of over 200 recently published guides Peter Taylor gives in the report of his Aslib survey.[13] *Perhaps* the answer is to make the subject more interesting by using audio-visual aids; *so* we all set about making audio-cassettes, tape/slide guides, video-cassettes and so on. *Perhaps* the real problem is that librarians just cannot teach; *so* we organize a project on teaching librarians how to teach.[14] *Above all*, everyone cries, we must evaluate; *so* we all set about arguing over which is the best method of evaluation!

Unfortunately, when we do evaluate, we usually find that our library instruction is not doing what we imagine it should be doing. For example, a chapter in the recent *Progress in Educating the Library User*[15] is bespattered with phrases like: 'although a statistically significant relationship was not found'; 'an unexpected finding'; 'no statistical relationship was observed'; 'one unanticipated finding'; 'neither experimental treatment was statistically superior to the other'; 'failed to confirm a significant difference'; and so on. No doubt it could reasonably be argued that it is misleading to quote out of context like this; or, more convincingly, that these 'evaluations' were measuring the wrong parameters.[11] But the basic problem, I submit, is that most of the user education which is the subject of those evaluation studies should not have been done at all.

I am more and more convinced that formal courses of library instruction should not be given by librarians at all (unless they are *subject* experts as well as *library* experts), because inevitably they will fall between two stools. On the one hand they will neither be detailed enough in a subject sense—not a library sense—nor authoritative enough to be of direct relevance to the student's subject area (authoritative in the sense of being given by someone who is specifically trained and practising in the subject area, and can command the student's respect). On the other hand, necessarily they can only begin to explore the boundaries of what is a large and complicated field in its own right—library and information science. It is no wonder that librarians are having difficulty justifying graduate professional status, if at the same time they are offering library users 'all you need to know about libraries in six easy lessons'!

For the business we are in *is* large and complicated and we should admit it. To take a few rather random examples:

(a) *Structure of the literature.* Consider the detail that it was found necessary to include in Parker and Turley's book,[16] or the UNISIST guide,[17] both of which specifically state that they are no more than introductions to library and information work in 'science and technology'. Remember that what you try to teach your user about the relative importance of the various types of literature in one specific subject area will not necessarily be relevant when he or she needs to find information in other subject areas (which is one of the reasons why three quite different packages have been produced by the Travelling Workshops Experiment[18] for the subject areas biology, mechanical engineering, social welfare). On a wider front, remember that communication patterns differ quite radically not only between broad subject areas,[19] but also within individual subjects.[20]

(b) *Bibliographical tools.* Note the tremendous growth in the number of bibliographical tools,[21] and how so many of the more recently developed ones are of inestimable value: *CSO Guide to Official Statistics; BLLD Conference Index; Social Sciences Citation Index; Research in British Universities, Polytechnics and Colleges*—to name the first few that come to mind. Your library user 'educated' ten years ago would not know of any of these (at least in their present format). Nor would the education given then in the use of many individual tools be very relevant today: think, for instance, how different *Chemical Abstracts* is now from what it used to be. And as for the 'catalogue', the recent issue of the second edition of the *Anglo-American Cataloguing Rules* should be sufficient reminder of the minefield you users enter[22] when they start to use your catalogues—if they do. (But note also that the topography of your library's minefield—even in these days of 'copy cataloguing'—will be different from every other library's topography.)

(c) *Indexing problems.* The problems of constructing and using the 'catalogue' are of course mirrored in the individual printed secondary sources. *We* know all about the 'vocabulary control' problems[23] that inevitably arise once an index gets beyond a certain size; and through study and long practice, we acquire an intuitive feel for how the particular information we need will have been indexed in the tool we have chosen. *Not so our*

> *users.* It may be possibly formally to teach users how to use a small number of bibliographical tools relevant to the specific subject area they happen to be studying at the time. But later when they will inevitably need to delve into other subject areas, even if they get to the right tools, as likely as not their use of them will be inefficient if not ineffective—unless they are given help on the spot. (Ask yourself why, even after strenuous efforts at brevity, a typical tape/slide introductory guide to an abstracting or indexing periodical lasts twenty minutes.)

Maurice Line characteristically summed up the position well:[24]

> 'With a large and complex body of knowledge on the one hand, and on the other a user who needs the information but has insufficient time and limited knowhow, some means of linkage between the two must be designed. If you bring the tools down to the user, you may make them ineffective, while attempts to take the user up to the tools have not been outstandingly successful.'

The library user education we should provide

My position, then, on the formal education of library users is as follows:

(a) It should not be carried out in isolation, but as an integral part of academic (including school) teaching.
(b) It should normally be given by the subject lecturers/teachers.
(c) It should aim to communicate the importance, *or otherwise,* of libraries within the context of a general study of information and communication.

The 'library' teaching integrated into a typical academic course I envisage as concentrating on 'process' rather than 'produce'; on teaching simple broad principles rather than complex details; on striving towards 'affective' rather than 'cognitive' goals. Students would be taught that libraries *can* be important sources of information, are necessarily somewhat complicated to use, but are staffed by people able and willing to help as and when necessary. The fact that many libraries seem more complicated to use than they need be, and that their staff seem not as knowledgeable and helpful as they might be, is not an argument for more library *user* education. It is an argument for more library *staff* education. (Perhaps I might stress at this point the excellence of the information guides that have been developed in recent years. *I* learn something every time I pick one up, but I don't believe the average *user* does.)

In trying to specify exactly what sort of help can and should be given to library users on the spot, in the library, we need to recognize that the majority of users in their work are what might be termed 'practitioners' rather than 'researchers'. A few years ago, Clark and Scott, in an OSTI sponsored study,[25] produced a useful characterization of the information habits of researchers and practitioners:

Researchers

—Emphasis on professional recognition as researchers
—High use of formal publications
—Active open-minded strategy to new information, which will be highly

valued as a means of achieving personal and group goals.

Practitioners

—Emphasis on goal of service

—Low use of formal publications

—Passive defensive strategy towards new information, with older knowledge and skills being valued, because they allow the person to get on with the job of providing a service.

One of the major mistakes I believe we have made in our thinking on library user education (and I subject myself to all this criticism—I have done all the things that I now feel are wrong), is to assume that every undergraduate is going to become a dedicated research worker; that every graduate chemist will need to be using *Chemical Abstracts* for the rest of his life. So we try to teach every undergraduate chemist how to use that necessarily complicated tool; and, inevitably, our teaching is too detailed for the course needs at the undergraduate level, and too superficial for the needs of those few undergraduates who will become postgraduates (and by the time they become postgraduates they will generally have forgotten the *details* of what we tried to teach them as undergraduates, in any case).

Perhaps I can bring this point home by reminding you that most librarians are *practitioners*. They very rarely or not at all use even basic tools like *Library and Information Science Abstracts*; and it would be almost inconceivable for them to go systematically through the eleven research procedures I mentioned earlier which are listed in the ACRL Objectives. A recently published survey of 105 public and academic librarians who acquired their ALA in 1966,[26] found that by far the largest proportion only read one or two periodicals regularly, and these tended to be titles which popped through the letter-box. 33 per cent of the public and 26 per cent of the academic librarians had read no books on librarianship at all during the previous year. Only 18 per cent of the public and 24 per cent of the academic librarians had read more than four books.

Those librarians and other practitioners who *do* make a serious attempt to get to grips with *primary* documentary sources, when they require or desire some information, Patrick Wilson[1] calls 'studious'. Clearly, 'researchers' are, by definition 'studious'; but it is important to note that even researchers will generally only be 'studious' in their own and closely related specific subject fields. Wilson summarizes the arguments of his first two chapters:

> 'Most of public knowledge is not accessible to most of us on the basis of unaided use of document collections, and most of us are insufficiently studious to take advantage of what is accessible and insufficiently imaginative to make helpful applications of the portion we do discover.'

It is not just that we are not able to make 'helpful applications'; it is also that it is so tempting to make 'unhelpful applications'. The Nobel prize-winner, Glenn Seaborg, in a chapter in a Nobel Symposium published a few years ago, *The place of value in a world of facts*,[27] stressed this point:

> 'Perhaps one cause of some people's adverse reaction today toward rationality is that the abundance of information available and the complexity of situations often overwhelm us One just cannot absorb and understand all that is going on in the world. It is difficult enough to keep up with one's own speciality, to maintain order in one's own daily life. Feeling that

> way leads many citizens to withdraw from participation and accept the words and directions of the experts. Many others tend to go to another extreme and, on the basis of what is often very superficial and sometimes false information, become their own experts—very vocal and active ones in many cases.'

Faced with the mass of complex information, is the answer then for library users to surrender *all*—if they are practitioners, or the *majority*—if they are researchers, of their information needs (other than routine ones) to library information specialists: to library information officers, reference librarians, subject specialist librarians, or whatever we might call them? Certainly, at present, Wilson believes not:

> 'Personal services provided by librarians at present are confined to bibliographical services of most use to the studious, and rest on shallow and undependable use of reference works to answer a limited category of questions.
>
> Neither the bibliographical nor the question-answering services amount to a functional information service of the sort that would discover the state of knowledge as it bears on particular problems.'

These are strong words, and Wilson apologizes for them. But I fear that they are generally true—it is amazing to hear the unadulterated nonsense that users are occasionally told in libraries.

Should libraries then develop themselves into sophisticated high-quality 'information centres'? Special libraries, yes—and, of course, there are already many excellent examples. Academic and public libraries, no. H. S. White said at the last Aslib Annual Conference:[28]

> 'In applied science and technology, business and industry, and government . . . the need is not for more sources of information for the ultimate consumer to scan—the need is for answers.'

That is fine for special libraries; but academic and public libraries generally have to cover such a wide subject area that it is not possible to employ enough specific subject experts. Wilson put his finger on the problem for 'academic libraries':

> 'Faculty members either do their own . . . bibliographical work . . . on the grounds that no-one else can be trusted, or delegate it to students. They might be happy to delegate the more tedious and menial chores to librarians, but would they be willing to delegate, and would librarians be prepared to accept, difficult and also extremely time-consuming jobs?'

I believe that they wouldn't, and more to the point, that they shouldn't, as I briefly argued on cost-beneficial grounds some years ago.[29]

So what sort of information service is to be provided by general academic (and public) libraries? Well, it is not so much an 'information service' as a 'facilitating service': our job, as librarians, is to facilitate the user's research, not to do it. Wilson, again:

> 'The librarian is not a specialist in information in general, but in information about records. The librarian's job is a job of management of information-bearing objects, and the continually improved performance of that necessary job is a natural and reasonable goal for the future.'

I freely admit that by merely showing our users what tool they should use and how they should use it to get the information they need, we have no guarantee that *they* will get out of the tool all the potentially relevant information that *we* would get out.[30] But we can only get out *potentially* relevant information; only they can get out *actually* relevant information. And, in any case, our fears on this ground are as often as not a result of our feeling that users must see *all* potentially relevant documents. Most of the time, all users need is a few relevant documents to give them a feel of the ideas that have been developed in the particular subject field, and to get their own thought processes going.

There is a nice piece on this in Lucas's book, *Style*:[31]

> 'But since for most of us the accumulation of facts does often prove highly exhausting, the vital point is to avoid getting stale. Often, indeed, the ideal of reading everything ever written on a subject seems to me a vain idol. Five centuries ago such an ambition was feasible;[32] today (*Lucas was writing in 1955*) it is often fantastic; tomorrow it will become still more so. Therefore it is important to develop a quick eye for fools whose books are not worth reading; and a quick power for disembowelling other books less foolish, but still of minor importance. Otherwise, before the author puts pen to his own paper, he may easily have become a stuffed owl, with nothing new to say and with no energy for saying it.'

Conclusion

In this paper, by stressing the nature of knowledge and the nature of the user, I have argued against two relatively recent trends in *general* libraries, particularly in the libraries of academic institutions:

(a) the increasing provision by librarians of formal detailed courses of library user education;
(b) the development of specialized information services by librarians for their users.

Some may feel that if these two more recently developed pillars of the modern library—the library conceived of as a 'dynamic information centre'—are taken away, academic librarians would merely revert to their previous predominant role of passive curators. This is certainly not my intention; though I am conscious that it has only been possible to give the briefest indication of the delicately balanced role that I believe is appropriate for the academic librarian of the future.

I may not have convinced you that lack of detailed subject knowledge should normally stop librarians trying to provide formal courses of user education and specialized information services. But surely you will agree that a priority before attempts at either of these should have been, and should be, the education of our library staffs, to the limit of each of their abilities, in library and information techniques, across the board. That is the least any user should expect of the staff of his or her library. User needs for information are so diverse and unpredictable that the majority just cannot be programmed into a library user education course or a library information service. Users need help from knowledgeable librarians when they need help. And if, indeed, we are moving to the 'paperless society',[33] the more librarians are concerned with the technology of information transfer,' rather than its specific information content, the more necessary will be their role in the future. In the development of on-line information services, we have already seen how important, and generally necessary, is the job of the 'intermediary'—the 'facilitator' of information transfer.[34]

I want to end, however, on a different note—I promised at the start of this paper that I would return to a point Wilson[1] makes on how 'questions of the distribution of knowledge in society touch immediately on profound questions of the whole social, political and economic organisation of society'. We need to see library user education in context, not only within the context of 'education', but also within the context of 'society'. Librarians talk bravely of how knowing how to use libraries and get the information we need will release everyone from the constraints and inadequacies of their present existence.[35] But the reality, it seems to me, is that 'education' as a whole, let alone 'library education', has had only limited success in this direction with the majority of mankind. Unless society changes fundamentally, it seems likely that the benefits of education, and of libraries, will for the most part continue only to be felt by those who are already culturally inclined. A book which treats this politically sensitive area in, it seems to me—as an *outsider*, a fairly detached way, is Harold Entwistle's *Class, culture and education*.[36] I leave you with two quotations from the book:

> 'The cause or condition of class, of disadvantageness or privilege, of one quality of culture or another, is the economic-technological structure of a society; people are privileged or disadvantaged, first, in the satisfactions they derive from work or through the brutalising and monotonous discipline it imposes on them. And if one's future seems destined to be unemployed or spent in routine unskilled labour, one probably cultivates a life-style appropriate to this condition.'

In present-day society people need first to feel that they are doing useful *work*. Their need for *culture*, however one might define that word,[37] will always be secondary. The second quotation echoes the point I quoted earlier from Wilson, of how a certain amount of basic knowledge is essential, if we are going to make meaningful cognitive progress in most subject areas:

> '(A) serious objection to the concept of education as primarily concerned with learning how to draw upon the data banks—libraries, computers, resource centres—is that there is a danger of people learning to write cheques on accounts which are empty; the data bank may be full of cognitive coins but this is unhelpful if there is nothing in one's own personal account.'

Perhaps, indeed, Aldous Huxley was right:[38]

> 'Technological progress has merely provided us with more efficient means of going backwards.'

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Science literature—how faulty a mirror of science?

Belver C. Griffith

School of Library and Information Science, Drexel University, Philadelphia, USA

I FEEL COMPELLED to present this lecture[1] by some of the strongest of intellectual needs, namely to establish the relationship of my own work and interests to those of other disciplines. Some terrors lie in the revealing of the character of that work, however, particularly the fact that it combines extremes of nitpicking and speculativeness. Special terrors lie in the realization that formidable intellectual disciplines are on a collision path with that work.

The broad problem is understanding 'the growth of knowledge', particularly of scientific knowledge. It poses a deep intellectual challenge: science is the uniquely successful social activity. Within it, humans function as groups to create an ever-increasing body of knowledge. We do not know whether we have better sculpture than the Greeks, or better drama than the Elizabethans, but we have better science than either and in some subject areas, we have clearly better science now than in 1974. (There is not quite universal agreement on the above, but near enough, and I will debate that sort of thing in footnotes.)[2]

I approach this main problem as one of a small group of researchers who perform statistical studies of scientists and scientific literatures; hence the title! From that fragile base, a somewhat esoteric form of census-taking, we seek to understand science and knowledge and to undertake certain useful tasks relative to science policy and to the management of document and information services. My colleagues—and myself—have written at sufficient length on the latter, quite applied problems, and in the present paper I seek quite a different goal.

My chief purpose is to discuss, on the one hand, our research in terms of more basic issues and to correct the almost complete lack of sensitivity to philosophical issues that has existed in our writings. On the other hand, I seek to present the case, as clearly and as simply as possible, that certain philosophers are in contradiction with fact. In short, I wish to mix two lines of inquiry—one research and one largely scholarship—and enlighten one and perhaps, restrict the other.[3]

A convenient point to begin is the International Colloquium in the Philosophy of Science at Bedford College in July, 1965. This was the confrontation between Thomas Kuhn and Karl Popper—and others, most being against Kuhn. Kuhn was responsible for the single most popular book in the philosophy of science, one advocating, as I am sure most of you know, that knowledge increases through a series of revolutions; Popper, for the most serious and persuasive attempt, attempts to deal with the philosophical problems raised by modern science. The hangers-on were, indeed, distinguished and this lecture is as much oriented to Lakatos, Feyerabend and Musgrave (and their subsequent

Aslib Proceedings, 31 (8), August 1979, p. 381–391. Printed in Great Britain

work) as to the principals. In this fairly hostile camp, Kuhn received every courtesy—including that critical last word in debate—save one. After five years of editorial bickering, the colloquium emerged as a book entitled *Criticism and the Growth of Knowledge*, locutions which are vintage, high-proof, Popper.

On reading, the discourse now appears, at many places, confused: the language was marvellously precise to amazingly elusive; the issues, technical to grand; the outcome, mixed. There emerged at least three Poppers, two Kuhns and two Feyerabends—denoted by subscripts and sometimes observed by that person himself, creating yet another set of Kuhns, Poppers and so on. Frankly, I had thought the use of this defensive ploy was normally restricted to academic administration, where it can be of great assistance, and carefully avoided in scholarship.

Despite the intermingling of attacks on ideas and people, the analytic purity of arguments which evoke 'the exception which proves the rule . . .', the colloquium and the subsequent contributions of participants seem to mark an intellectual high point in relating analytic philosophy to a realistic view of modern science. They corrected the idolatrous but trivial view of science presented by the logical positivists and rejected views, heavy in certain traditions, of science growing by the accretion of proven fact. They made clear that induction—as described by Bacon—would probably never allow you to recognize a sparrow in your back garden and drew attention to the transitory nature of knowledge. They made clear that a scientific observation must always be theory-bound. (I am startled to realize that, so far, I have really spoken mainly of Popper's earlier 1934 contribution.)

More recently, there has developed a clearer conceptualization of non-accretional, revolutionary advances in knowledge, and there is now general understanding that a new theory does not necessarily speak the same language as the theory it replaces. The final development of interest to me was Lakatos' beginnings of an analysis of the relation of theories, findings and predictions toward a meta-theory of research programs. This effort was answered by Feyerabend, who rejected the possibility of judging a research program, or theory, or even science, on the basis of method. This sharp, evidently friendly, debate was ended by Lakatos' untimely death.[4]

Feyerabend's later contributions introduced two rather emotional themes. The first was a sense of fun: Feyerabend writes learned, wicked jokes, holding little back, and creating 'anything goes', his final judgment on method, as the first catchy slogan to grace such scholarship. Freely, he speculates as to whether the differences in Popper's and J. S. Mill's concept of Liberty stem from the presence in Mill's life of a particular lady, Mrs Harriet Taylor, and the absence of a similar lady in Popper's. I won't venture to speculate on the possibilities this approach opens, if it becomes established tradition in scholarship.

The second theme is a growing sentiment against science and scientists. (There seems a watershed in the *British Journal of the Philosophy of Science*; all books of prominent scientists about 'how we did it well' seem praised until 1968 and condemned thereafter.) At its best, this sentiment is not the comparatively simple idea that science produces technology which, in turn, produces war, pollution, and stimulates the wealthy, the western and the capitalistic to live beyond the world's means—no, the objection is moral and involves quite an analytic argument. This argument goes about as follows:

> Science is authoritarian; it imposes a hierarchy on its practitioners; it restricts the possibilities in life. Moreover, if we can attack science's claim to rationality, particularly its reliance on an established method, we can show that it is only a state religion, and not a very amiable one.

I shall speak of some technical issues regarding that argument. I would like also to note that Erik Tranoy has made a broad attack on this position by his cogent argument that value-free inquiry is completely impossible and by relating that argument to a broader moral system.[5]

Before turning to my own area of research, I would like to make a final observation. The camp of philosophers, however deeply divided, is outspokenly hostile to the possibility of turning for answers 'to sociology or psychology or . . . to the history of science' (Popper's words). Somehow, since I have been called a sociologist, was trained as an experimental psychologist and have been accused of doing the history of science without a license,[6] I feel included; but the main question is how they avoid the self-evident fact that science is a human activity. The manœuvre is simple: they claim to be concerned with that body of knowledge, mainly recorded, which grows independent of the skills, failings and expertise of individual scientists. They set their task as being to develop a logic for that idealized world of knowledge, removed from action and experience.

Let's turn now to my own grubby world of numbers and model-building. First a group of scholars who count fleas and talk about God must be able to do its sums, so there is normally considerable technical detail in discussing this research. That will be suppressed; I will note only that we are constantly borrowing, stealing, and inventing new ways of twisting about middle-sized discrete numbers.

Second, I wish to note, but not dwell on, the common criticism that statistical studies of science treat all scientists or all documents exactly alike. Einstein and the research students at Slippery Rock State College are each tallied once; the shortest note in *Nature* and Pauling's *The Nature of the Chemical Bond* receive the same treatment.

However, that is the whole point, namely, to develop a discipline or specialty which identifies and displays the distinctive functions of authors and documents in the growth of knowledge as formal properties. Hopefully, these functions will also be related to—but not dependent on—either scientists' subjective evaluations or upon analytic relationships within scientific debate.

Although the counting of scientists or articles or something dealing with knowledge-mongering started at least as early as the 1920s, a key event was Derek Price's 1965 article 'Network of Scientific Papers'. Price had received a doctorate in experimental physics here and, although he had suffered some sort of conversion and a second doctorate in the history of science at Cambridge, he was still prepared to grope about in numerical data. This paper was not his first venture in counting people or documents; it was not, in keeping with *Science* magazine's editorial policy, even very long. It has, however, a first meaningful meshing of an explicit model for science with raw data, and the results were surprisingly elegant and clever.

Modestly enough, the paper set out to describe the 'world network of scientific papers'. While the paper may not have quite managed that goal, it clearly displayed the broad pattern that scientists follow in referring to previously published documents, and by inference, something about the way new science builds on recorded knowledge.

The paper's cleverness with numbers and ideas is irrelevant here: the idea of science building 'at the skin or surface', new science floating on about the past thirty or forty previous papers, the laying down of an archive, and the identification of an extreme degree of élitism in science, were important.

Were the results all that surprising? Possibly not for an especially acute, active scientist—although I question the obviousness of almost all the more detailed findings. The more important feature was the implied research program, resting mainly on the possibility of quantifying and comparing measures of scientific progress, measures of élitism and a measure of a 'research front'.

Needless to say, this and Price's subsequent papers had little effect on the history and philosophy of science. Historians graciously allowed as how such aberration should not detract from his serious work on the history of scientific instruments. The philosophers of science did not take, and now seen from this vantage point probably should not have taken, much notice. The new findings related most closely to views they were discarding, such as an 'accretion' of 'proven facts'. There was knowledge—questionably—growing as a pile of documents, and there was knowledge—again, questionably—being used as references to that pile. To have taken this image seriously would have wiped out many 'hard won distinctions' that philosophers had wrested from their own scholarship. Close congruence with the philosophers' views have only appeared near the end of these first phases of research, really within the past year or two.

The largest portions of the next group of studies was performed for the practical reasons of obtaining data for the management of information sources and the organization of libraries. Brian Vickery and B. C. Brookes of this School, their students and associates and others, have made notable contributions; however, I will mention only a few ideas—which could not and do not stand in the isolation in which I place them—and which start fencing the prairies on which the philosophers have been free to roam.

Let's start by identifying the persons who have surveyed these prairies. Most notably, Eugene Garfield had developed an information service which has developed to the point of examining on an annual basis the references in half a million documents to, as it happens, about eight times that number of older documents. His writings furnish valuable dimensions on the care of the scientific literature and on the nature and diversity among the world's scientific journals.

Following upon a discovery made by Bradford, Brookes, working amongst a host of other contributors, developed a technique to establish the limits of subject-matter areas in terms of total number of documents. Although the work was done from limited document collection, we know that similar limits can be established for the entire world's literature.

In all of the above, we are not discussing knowledge, merely paper. However, the research was, and is, going forward in orderly steps to establish both the extent of science's literature and the size of its internal sub-divisions. The implications, particularly of the vastness of the literature, come clear later.

Separately, other investigators were examining temporally determined processes. William Goffman examined the growth of specialty literatures over time and saw, within those smooth curves, an analogue to the spread of epidemics. New problem areas 'infect' and proselytize investigators, concepts which raise the possibility of statistically studying problem selection in science. William Garvey and myself developed a rough 'natural history' of the production, dissemination and use of information in psychology. The ultimate products were a description of various disseminations of information and of the function of various communication channels; a revealing of the interpersonal interactions involved in research from start through publication, but also, and perhaps most importantly, the winnowing away of chaff in the development of the discipline's knowledge base. (It is almost the case that science operates through junior researchers working hard to produce a literature on which senior researchers work even harder to throw 95 per cent away.) Price's and others' concept of 'packing down' of knowledge proved in our view to be an integral part of a discipline's communication system, involving ruthless judgments in rejection and selection of material and continuing intellectual criticism and integration.

Recently, these lines of research have been summarized by Michael Brittain and A. J. Meadows in excellent books. These books, particularly Meadows', the more recent, cover considerable breadth of material, and the contrast in perspectives, applied social scientist *versus* working scientist, is instructive. The books are, however, philosophically blind—but perhaps nothing really was lost.

All the implications of such research would be rejected in the philosophical debate that raged simultaneously. For us researchers, science appeared in our data as 'accretional', 'proven', 'continuous' and 'rational'. In our role as observers of science we were heartened by several events. During this time, two anomalous situations, Heeger's claim of organic super-conductivity and the Russians' polymerization of water, appeared and were handled as easily as wiping up spilt milk on a well-waxed floor. Continuity and rationality reign here. There was no point of contact between the research on science and the philosophy of science.

Henry Small and I are now obtaining results which make more sense of both empirical and philosophical approaches to the study of science. The basis of this research is a technique that groups older documents which are cited in similar ways by the current literature. The idea was apparently first suggested by Kessler;[7] the discovery was independent of that and made simultaneously and independently by Henry Small and Marshakova, a researcher at the central Soviet scientific information service. Each showed that such groupings of documents corresponded well with scientific specialties, i.e., clustered documents proved, in fact, to be on the same topic. In later work, Henry and I showed that this technique could display the macro-structure of science and the internal structure of individual specialties. We had developed a strange map in which documents could be related one to another in specific problem areas and then, in turn, problem areas as groups of documents could be related to complete the map. Dimensionally, it was ridiculously simple; science seemed to fall into understandable patterns with three or four dimensions.

In our recent unpublished work (we both hate to write) we have examined changes over time in the internal structure of specialties. In this research we compare the position of documents and their appearance and disappearance with changes in the scientific content of the specialty.

In this view of science, 'accretion' and 'proven fact' seem to disappear; there is astonishing discontinuity in the best parts of science. Change is sudden and is as much concerned with the rejection of documents—and actual ideas—as with acceptance. The large, neat 'knowledge pile' is gone; science was apparently so vast that averaging had distorted local detail. Also, the perturbing documents—those creating the greatest discontinuity—revealed no consistent research strategy or content, some appearing to go as directly counter to Lakatos' ideas as possible. We are not quite ready to say, with Feyerabend, 'anything goes' but, at least, we would bet that there is the possibility, within the broadest range of theoretical distinctions, of hitting upon a successful research strategy.[8]

This hasty and biased view of two complex areas of inquiry will be concluded now with an equally hasty and biased discussion of several points at which these two fields interface. In this, I wish to express several generalized misgivings about the philosophers' approach to the study of science and then argue two specific points.

My generalized misgivings have, perhaps, more to do with my psychology than much of anything else. First, in dealing with the philosophy of science, I had a growing discomfort which defied diagnosis until I recognized the absence of a time dimension in their analysis of science. Passage through time is not a dimension of formal analysis; it is the main dimension of science. Second, but less perturbing, was the absence of scale in their discussion of sciences; they could report long periods in the history of physics as a dialogue among a few people. Finally, I realized that their discussion had virtually exhausted the language resources for dealing with abstractions like 'theory', 'hypothesis', 'problem' or even Popper's use of the word 'mistake'. The nomenclature was, in part, generating those bevies of Poppers and Kuhns, and learned discussion moved, without much restraint, between level of abstraction. While they wished to keep out sociologists and psychologists, they felt free to play such roles themselves.

Let us turn from these vague objections, become specific and talk about my first point, crucial experiments. Michael Moravcsik has allowed me to observe a theoretical physicist, himself, read the sociology and philosophy of science and this started me worrying about crucial experiments and their relation to the philosophy of science. It began with his asking 'If this fellow, Kuhn, was a competent physicist, how could he write that there are no such things as crucial experiments two or three years after the overthrow of the conservation of parity?'[9]

How indeed? And how could modern philosophers accept the impossibility of doing crucial experiments as self-evident? If by crucial experiments we mean a single experiment that results in the general acceptance or rejection of a major theoretical point, there are crucial experiments. Pauli stated that conservation of parity had to be true several weeks before the Lee and Yang experiment and announced his acceptance of their disproof immediately after the experiment. Baltimore and Temin's discovery of reverse transcription was followed, within weeks, by Crick's discussion in *Nature* of its theoretical importance. Unfortunately, Crick was not so obliging as Pauli and did not furnish a useful, nicely timed, pre-discovery denial of the possibility of reverse transcription.[10]

We have created some tools to examine the impact of such a discovery. In the following ten months, 150 studies were based on Baltimore and Temin's work. We have observed in later years how other documents clustered about the documents reporting the discovery, as the discovery gradually took on methodological importance. At the end of five years—apparently the minimum time for the paperwork—both researchers shared the Nobel prize.

While we observed nothing else quite as dramatic, we have now followed a variety of minor 'revolutionary' discoveries, each creating a nearly instantaneous change in the literature.[11] (So many new papers cited Baltimore and Temin, that they were clustered in the same year they were published most of these other crucial papers are clustered and appear to have substantial effects within one year.) Let me briefly summarize the characteristics of 'crucial' experiments we have observed:

> The issue at stake is important and the theory has been worked out for some time. Temin had regarded reverse transcription as the most likely explanation for earlier findings; but the community suspended judgment. A friend has been carrying the load of a very major hypothesis—with both broad medical and theoretical implications—and I have observed his community's rather bored suspension of judgment on his views. Naturally, one compares him and others like him with Temin and wonders about the number and difficulty of the steps which might furnish proof.

The proof is clear in the crucial experiment. Temin described his experiment as not important in itself, but as completing the last step in a syllogism. Hepatitis research expanded rapidly when one researcher, focusing on method, found that an antigen was nearly 100 per cent associated with a form of hepatitis.

> Ideally, the outcome is predicted in a simple experimental setting working well within well-explored ranges of phenomena and methods. That is to say, the results are the outcome of a special combination of conditions derived from theory and are not merely exploratory. Many of the most telling of these studies can be performed within a few days, or even hours.

In a nutshell, in our results, the major shifts in emphasis stem from studies that test generalizable hypotheses and models, that yield clean results, and that are performed well within the technology of accepted experimentation. Where we have had the information on theory, the theoretical apparatus is thoroughly worked out before the critical findings. We do not find evidence favoring

Kuhn's Gestalt-shift concept for the creation of knowledge; the theory seems to lie about waiting for the findings.

When I turn to the philosophers' denial of the existence of 'crucial experiments', I begin to believe that it has an ideological thrust. Now I wish to make a complex point and I require your patience in allowing me to parody two points of view and to talk about 'rationality' but not necessarily to believe in it.

First let me take the professional philosopher's position:

> 'As philosophers, let us deny "rationality" to actual science done by real and fallible people and retain it for the idealized world of knowledge for which we philosophers seek to develop a "logic". If there are crucial experiments, there is instant access to knowledge by flesh and blood researchers, and an independent point for "rationality" and we might have to study people.'

Now, speaking as Feyerabend:

> 'I will play your, the philosopher's game, in your world and issue this challenge: you cannot make a rule regarding knowledge that I cannot disprove; therefore, there is no method to science; therefore, science is a state religion no better than witchcraft—and witchcraft might be a lot more fun.'

At many points, our data agree with the details of Feyerabend arguments. However, if crucial experiments exist, that fact destroys the foundations. Accepting the 'crucial experiment' moves rationality out of the analysis of science into the doing of science and, simultaneously, weakens any attempt to create a 'logic' of scientific knowledge or to argue against science by debating that logic. In other words, the 'rationality' of science may lie not in the logic of static knowledge but in a dynamic process—a view with which Feyerabend is not debating, in fact, a view quite foreign to the philosophy of science.[12]

The next issue I would like to consider is the world of knowledge, some special enduring residue of scientific activity for which philosophers seek to develop a 'logic' independent of the foibles of people.

For me, an original difficulty is that the philosophy of science is mostly the philosophy of parts of theoretical physics in which change appears much like a change in musical style. Within each, a tight formal system can be explored in an infinity of expressions or predictions—depending on the discipline. The essence of the system has little bulk; its creation may result from a dialogue within a tiny community; the implications are infinite.

In contrast, much of science and perhaps 70 to 80 per cent of published science deals with immense bulk; hierarchical levels of phenomenon; and variable patterns and degrees of generalizability. Comparing quantum mechanics of the 1920s with biomedicine of the 1970s is rather like comparing the Holy Ghost with Harrod's.

Let's forget that image and turn to some numbers. Let us say that reverse transcription and its consequences are some sort of knowledge clump originating in two papers appearing in *Nature*. What were these papers taken from?—Taking the top 2 to 4 per cent of all journals; considering only the 40 per cent which are biomedical; and using a low estimate for their average number of articles, yields just about 1000 × 4 × 100 = 40,000 articles. The problem of selecting those two papers from 40,000 is only a couple orders of magnitude less exacting than extracting gold from seawater (which makes up several parts per million).

The creation of knowledge for science as a whole involves judgmental processes at a barely believable scale. Each of the several million documents produced annually by science is already the outcome of series of selections and evaluations; each, upon publication, is subjected to a new series of evaluations and selections. If there is an 'immaculate conception' of knowledge, it could only occur with a cast of thousands.

These complex judgmental processes may either work well or, more likely, exist in such a complex world that their mistakes are hidden. In general, the number of prominent errors, like the rediscovery of Mendel's work, seem few and predictable. Geniuses may say things for which no one is prepared. Any quality of operation is paradoxical and must stem from the numbers involved, the second chances and alternative opportunities. Research shows that scientists do an unreliable job of judging the scientific quality of individual papers. All measures work well when the judgment averages across all a researcher's work, and fortunately many of the important decisions are made with regard to people.

The writers who touch on this problem, whether speculative, like Boulding and Kochen, or directly concerned with specific scientific problems, like John Ziman and Garvey and myself, have barely scratched the surface of this topic. The problem of 'transforming information into something much more than information' lies at the heart of information studies and is the only means of access to concepts of authority and wisdom as they legitimately exist, and I believe that they do in research and scholarship.[13]

I have raised this second problem of the 'world of knowledge' to complete what is really an argument on the site of 'rationality' or method begun with the discussion of crucial experiments—my major point is that one cannot completely deny 'rationality' to the world of action and experience; one cannot completely eliminate 'irrationality' from a world of knowledge.

In regard to my arguments against and misgivings about the philosophers of science, I have invited them to share my very own Procrustean bed, and they, thus invited, have every right to refuse and even to pursue their work, as some seriously suggest, with entirely fictitious examples. However, nearly all have been free about discussing practical policy decisions, and inventing sometimes hostile reactions to the views of 'real' scientists on the doing of science.

My goal is not just to criticize errors but to drag them into argument and discussion and this is motivated, in part, by admiration and, in part, by necessity. The admiration has been evident; the necessity arises from my belief that they, in a manner resembling those philosophers who preceded experimental psychology, have furnished a useful theoretical base for empirical studies of science. My hope is that these talented people will pause, in their own debates, to talk to us about data.

NOTES

1 Given as a University of London Special University Lecture in Library Archive and Information Studies at University College on 27th November 1975, and prepared during

the author's tenure as Honorary Research Fellow, University College London, and Visiting Fellow, University of Sussex, while on leave from his duties as Professor, Drexel University, Philadelphia. He acknowledges, with gratitude, the support of Public Health Service, US Department of Health, Education and Welfare, Grant RO1-LM 00911-06 and of Drexel University.

The work was stimulated and influenced, at an informal level, by many persons, particularly by B. C. Brookes, (UCL), Brian Easlea (Sussex), K. E. Tranoy, Professor of Philosophy (Bergen) and Michael J. Moravcsik, Professor of Physics (Oregon). The argument, here, is informal and appears with preliminary footnotes. A separate monograph publication is planned for the final set of notes (Brixton, The Proletariat Archives, forthcoming).

The submission of this lecture for formal publication was delayed by concern for its speculative character and by the question of whether it should be translated from the English for publication in the United States. Translation seemed likely to do some violence to the less objective content, and data now supports the wilder claims made herein. My image regarding the extraction of gold from sea water was shown, however, to be about an order of magnitude off by M. Carl Drott, and Richard Burian apprised me of the analysis that there could be no fully logical critical experiments in view of the range of possible deductions from theory and the latitude in the assumptions required to translate theory into test through experiment or observation.

2 The complete unoriginality of the first of the paragraphs astonishes even its author, yet it is still, of course, a necessary point to make. I am combining ideas and examples from Karl Popper and Derek Price, an apt exercise in view of the goals of the lecture.

The points of disagreement as to whether science 'progresses' are raised by several books and, in part, ambiguously endorsed in Feyerabend, P. K., *Against Method,* London, New Left Books, 1974.

These writings test readers' 'suspension of disbelief', and I flunked. The usual examples, such as acupuncture, are adduced. (With regard to that example, one might prefer to start with western studies of suggestibility and immunology to explain acupuncture than with acupuncture to explain molecular biology.) There is also a tendency in these writings to look for and to claim as identities an idea, which appeared as a hypothetical point in Greek, with a similar idea that appears as part of an elaborate system of findings, equations and explanations in recent science and to conclude, thereupon, a lack of progress. The reader may view these similarities differently; see also, Holton, G. 'On the role of themata in scientific thought', *Science,* 188, 1975, 328–34, indicating the role of broad conceptual schemes in science.

3 Once I had set these goals, I realized that a near majority of the events and people were associated with this university and that I was really talking about work and development over exactly ten years, a curious and unplanned coincidence of place and anniversary.

4 Perhaps the easiest way of following this is reading backwards from Feyerabend's *Against Method,* mindful that Feyerabend had expected an answer to his arguments that was prevented by Lakatos' death.

5 Unfortunately, most of K. E. Tranoy's work is in Norwegian, the exception being his contribution to Conference on the Philosophy of Science, Oxford, October 1975. I can furnish copies.

6 My article on coherent groups in science (with Nicholas C. Mullins) *Science,* 177, 1972, 959–964, is, perhaps, evidence for the prosecution.

7 I cannot locate this, and I would welcome help. I wonder whether the author anticipated all the uses alluded to in this paper.

8 I do not believe that anything resembling formal proof is possible. The evidence, a case study of collagen research, which is most striking to me, was developed by Henry Small, 'A co-citation model of a scientific specialty', *Social Studies of Science,* 1, 1977, 139–66. A band of skilled researchers continued work for years under conditions of nearly continuous Lakatos' 'degeneration' of research programs, with only the realization of collagen's biological function and of its position as a representative of a special class of materials. The work ultimately generated findings of medical and theoretical importance.

9 I hope he will forgive my paraphrase. While I plan to discuss this with other physicists, the reader without access to people interested in the question might consult Hafner, E. M. and

Presswood, S. 'Strong inference and weak interaction', *Science* 149, 1965, 503–10. The other examples are taken from work performed by Small, me and our associates on collagen, reverse transcription and hepatitis research, the comparison of which is in the process of being written. The logic behind Temin's discovery, later discussed, is explicated by him in 'RNA-directed DNA synthesis', *Scientific American* **226**, 1972, 24–33.

10 Obviously, I hope the philosophers do not insist on prediscovery negative votes as a condition to establishing the 'criticalness' of discovery.

11 The use of the adjective 'revolutionary' does not do complete violence to Kuhn. He can be quoted (as in 'Reflections on My Critics', p. 249, *in* Imre Lakatos and Alan Musgrave, eds. *Criticism and the Growth of Knowledge,* Cambridge: Cambridge, 1970) to suggest that any major finding is, in fact, revolutionary.

12 My first thoughts in preparing this lecture revolved about the character of science existind as serial events in time and its contrast with the timelessness of analysis. Scientists seem supported by the plausibility of continual, improbable coincidence of theory and fact; ang there is the question whether this view can be elevated from mere 'psychologizing' to being a formal system. I believe that it can.

13 The introduction of a concept of authority presents difficulties which are obvious to me and implications which I personally do not like.

The commission of European Communities' education policy information network: prospects and problems in the UK

Jim Davies

Head of the UK National Information Unit, NFER, Slough

This paper gives an overview of the developing educational policy information network and shows how this European initiative together with parallel initiatives in the UK have lead to the establishment of the Educational Policy Information Centre (EPIC) project at the National Foundation for Educational Research (NFER). The LEA experiment, within the EPIC framework is outlined. Similarities and differences in approach and actual and potential problems at both the Community and the UK level are set out.

A REVIEW OF the background of European Co-operation with substantial emphasis on the Council of Europe's EUDISED programme has been written by Davies.[1] Because of the emphasis on closer co-operation on educational matters between the Nine, reflected in the 1976 Ministerial Resolution which set up the initial EEC Education Co-operation Action Programme, the Commission of European Communities is now additionally involved in education information transfer.

In Brussels, the Commission Directorates concerned are DG XII, which is responsible for education, science and culture, and DG XIII, which is concerned with the exchange of scientific and technical information. They put forward proposals in 1977 for the establishment of a network of Information Centres in education between the Member States of the Nine. The network was envisaged by DG XII as providing a supporting service to the Community education co-operation programme, in that the preparation and exchange of information was seen as underpinning joint action through projects and policy development, in the same sort of way that more frequent contact between policy-makers between Member States was also expected to contribute to the Programme's success and the needs of Member States. Consequently, the network is conceived in terms of helping policy-makers in the Member States of the Nine, as its first target group, but this will be widened later to include teachers in a second phase and other phases are planned.

The substitution of policy makers for researchers as the top priority group is exclusively the achievement of DG XII and the Education Committee of the Nine which meets monthly in Brussels. I have attempted to assess the significance of this in a previous article.[2]

On the other hand, the remit of DG XIII is to help in the sharing of scientific, technological, social and economic information between the Nine. To do so, it

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needs to set up an infra-structure for information exchange and top priority has been given to developing EURONET: a computerized network which will provide access to over 100 data-bases throughout the Community. DG XIII has also moved into the software-support field by developing multilingual tools to help exchange information. So far, DG XIII has spent no money in support of the 'soft' sciences but it is possible that it might be able to contract for infra-structure development in the education field, provided there would be long term benefits to the Community at large and the investment contributed to the development and use of EURONET. EURONET will of course be linked with North American information networks and their commercial host computer services (Lockheed/Dialog; SDC/ORBIT etc.) to obtain educational, psychological and sociological information from appropriate data bases.

The Directorates General mentioned, with DG XII as prime mover, have agreed that the Information Network on Education of the Community will consist of ten National Information Services (two for Belgium) in the Member States and the Central Unit (CU) of the Commission.

Each National Information Service (NIS) will have a national unit which will co-ordinate the activities of Specialized Subject Information Centres (SICs) in that country, with regard to the clientele and topic areas envisaged.

These areas of specialization for the first period of operation are:

—education of migrants and their families,
—policies of admission into higher education,
—teaching and learning of foreign languages,
—transition from school to work—in which the Community has launched a co-ordinated programme of twenty-eight pilot projects.

All appropriate SICs (*i.e.*, all of those with a useful contribution to make in the four areas listed) will be co-ordinated by the national centre in question.

The broad objective to be met by the National Information Services as a whole is the provision of information to requests from Information Services of other Member States, from the Central Unit or from institutions and individuals of the Service's own Member State. For this to happen in a co-ordinated way which will allow for a quick retrieval of existing material Community wide, the National Services will devise common technical procedures of information handling.

Basically then, the Specialized Subject Information Centres are the original sources of information about the four specific areas of specialization and form the hard core of the Network. It is thus of vital importance that each National Information Unit is in direct contact with all of the SICs of that country so that information requests can be channelled quickly to the competent source of information. (Should anyone reading this article in *Aslib Proceedings* wish to involve their information centre in this activity, please will they contact the author directly?) Evidently, in different national systems it will happen that information related to one area of specialization is located at different institutions. Furthermore, it is clearly necessary to prepare the ground for satisfactory working relations, on a bilateral basis, between the SICs of different Member States dealing with the same topic. As will be appreciated, the general phrase

'Information Network on Education in the Community' covers, at present, four specialized sub-networks operating within a common framework of objectives and technical procedures.

The National Information Units (NIU) constitute a second tier in the overall structure contributing to the exchange of information in a more general and often in a more indirect way.

The NIU has three different kinds of task to fulfil which are the animation and organization of the information flows within the National Services and at Community level, the provision of a more general kind of information with respect to the National Education System in which it operates and the channelling function in directing all requests for information of a specialized character to the appropriate SIC.

The National Information Unit must therefore:

—set up appropriate links with all SICs;
—arrange for its national environment a common set of procedures for the information exchange between all institutions and individuals concerned;
—contribute in the establishment of common Community facilities of the Information Network (*i.e.*, thesaurus construction and maintenance and the monitoring of national information flows).
—build up an appropriate filing system which enables the NIU to have an easy retrieval of sources of original information and matters of information already handled within the National Information Service;
—promote awareness in educational policy makers of the services of the Information Network;
—channel incoming requests for information to appropriate SICs;
—respond to all kinds of requests which are of a more general nature than those which fall within SIC competence.

The *information flows* within a NIS are generated by the different functions the NIS has to fulfil in relation to the national system and in relation to the Network as a whole. Thus:

—if the SIC concerned with 'the transition from school to work' receives a request for information direct from a client, the answer will of course be sent directly to the client but a copy of it, or a reference to the material provided, will now be sent to the NIU together with the client's question. (It is of course a simplification of the situation to assume that one SIC will have sole responsibility for this particular action theme.)
—if the NIU receives an information request on 'modern language teaching' which it sends to the appropriate SIC, the SIC will answer the client's question directly but will send a copy of the answer to the NIU.
—if the NIU receives a general request, it will answer this directly.

At the time of writing, the Central Unit (Brussels) has not been set up and the links between NIU's and the CU are not dwelt on in this paper. However, apart from organizational matters, they concern the establishment of a common catalogue of the CU in parallel with national catalogues. The CU catalogue will be at the disposal of all NIS so that after some years of operation, the Community-wide retrieval of information will become easy and much quicker than it has been to date. Ultimately, the CU will answer questions relating to the Community as a whole and perhaps become the focal point for obtaining information on other international activities.

The transfer of the information exchange in the medium term to a computerized system will change the NIS functions only slightly in the sense that it will make the tasks of monitoring and retrieval much simpler.

I would now like to trace the effects of these developments on the UK scene and finally draw out from this summary the disjunctures and problems which have resulted from a *dual* initiative, *i.e., although the Centre has certainly been set up in response to the resolution adopted by the Education Ministers of the EEC countries in December 1976 it has also, and equally validly, resulted from perceived needs in the UK which coincidentally were already identified and came to the fore about the time of the EEC initiative.* As will be seen, whilst evidently similar these information requirements are not necessarily identical to Community requirements in all respects. In sum, this separate UK initiative amounted to the need to develop a *coordinated National Information Service* to meet the *current* information needs of UK policy makers and in particular those in *Local Education Authorities* in the first instance.

Thus, when it became apparent that an active UK Centre operating within the EEC context was required, it was realized that existing UK requirements were such that the Centre must have dual functions:

(1) to provide information of value to UK policy makers to help LEAs and central government alike to do a better job. The initial focus to be on LEAs.
(2) to provide information on UK policy to the counterparts of our policy-makers within the other eight states of the EEC and to integrate UK activities within a Community-network frame of reference.

A proposal to establish this Centre at the NFER was approved by the Department of Education and Science as the NFER Information Division already had considerable expertise in, and an established communication system for, collecting and disseminating certain kinds of 'policy information' and dealing with specialized questions outside the area of 'pure' research. It is clearly appropriate to build on this and the Centre will become an integral part of the NFER Information Division's activities, accounts of which have been set out by Davies.[3,4] The Centre has been established on a five-year experimental basis from April 1978 to March 1983, a review of progress will be made in January 1981 and a decision on whether or not to continue the work beyond 1983 will be taken in March 1982. The introduction of a charging system, for the services of the Centre, will be an important question at this point, since the aim is to become fully or mainly self-financing. (How this could be done is, in part, a technical question which will need to be considered in relation to the growth of computerization of information: but absence of computerization can not preclude its proper examination.) The functions and services of the Centre are provisional in the sense that they can be revised as need be, particularly as the

Centre hopes to offer services 'responsive to the changing patterns of needs' and must be capable of modifying its structure in order to accomplish this.

At the heart of the Centre's activities is an *experiment* which is intended *to assess the values to the LEAs of the Centre's current services and determine how these should be developed.* Mr George Cooke, who was until recently County Education Officer for Lincolnshire, has agreed to serve as consultant for this purpose.

The objectives of this experiment are to establish what are the most important and urgent needs of LEAs in terms of 'policy information', to create appropriate machinery for supplying that information and to test the uses made and the benefits received from EPIC (the Educational Policy Information Centre) by local education authority 'policy-makers'. This empirical approach should allow judgments to be made about the values of EPIC and the extent to which its area of operation could profitably be widened within the UK and as part of the EEC network.

In seeking to establish what are the most important and urgent needs of LEAs for 'policy information', it has been though desirable to keep in mind the following criteria:

—each theme selected should be of immediate and/or continuing concern for local education authorities so that they will provide a significant input to the centre as well as using the output from it.

—each theme selected should preferably be of general concern to all participating LEAs.

—each theme selected should be one in which individual LEAs have a significant policy *determining* and *implementing* rôle rather than merely a rôle of influencing and/or accepting policies decided by central government or other bodies (*i.e.* the themes should be those in which there are no firmly established 'norms' or clearcut national policies or general policies recommended by The Council of Local Education Authorities, The Association of County Councils or The Association of Metropolitan Associations, but within which each LEA has substantial discretion to decide policies and carry them into effect in its own way). *In essence, the autonomy of participating LEAs in a particular theme area is a prerequisite for its acceptance and a major determinant for EPIC involvement.*

—each theme should be such that problems of confidentiality will not inhibit the free flow of information.

As a stated aim is to link in with the EEC information network, the four principal action themes, as set out above, must warrant primary consideration. However, the issue of over-riding concern is to determine what are the educational policy information topics of greatest current importance to LEAs given the aforementioned constraints of 'determination and implementation'.

The four Community action themes will be briefly examined:

—'The transition from school to work' clearly satisfies all criteria.

—'The education of migrants and their families' whilst having a rather different meaning for the UK than for most of our European partners, has the disadvantage that the problems of immigrant children vary greatly from one LEA to another, though all have a common concern in education for a multiracial society.

—'The teaching and learning of foreign languages' is a theme where there is one established and highly reputable SIC in existence: The Centre for Information on Language Teaching (CILT). The closest informal links have been established between the NFER's Information Division and CILT and these links are, regardless of the EEC initiative, being strengthened in a variety of ways. It is anticipated that CILT will join with us in the terms outlined above.

—'The policies of admission into higher education'. Co-operation in higher education figures prominently in the Resolution of 9th February 1976 and includes such aspects as increased mobility for students and staff, the mutual recognition of academic qualifications and the recognition of periods of study spent abroad. There is already some expertise on equivalence in the UK in the shape of the British Council's Equivalence Centre.

It seems likely that there are other themes which LEAs would regard as equally important and no less urgent than these. It has been accepted that it will be necessary in the early stages to choose a limited number of themes (five to ten), so that they can be dealt with in some depth. It has been accepted that between twenty to thirty LEAs with 'sympathetic' CEOs (Chief Education Officers), will be selected as those most likely to be interested in EPIC and keen to use and contribute to the services provided. Mr Cooke, as consultant, will discuss with these CEOs and their principal assistants which themes will be of greatest importance to them. Amongst these which will be considered are:

(i) the transition from school to work and the interface of education and employment split into such 'sub-themes' as: Counselling services (careers, curricular, personal); work preparation and work experience, relations between education and industry; young people with special educational needs; 16–19 education generally—provision, rationalization, co-ordination; Further Education developments, relationship with the Manpower Services Commission, ESD/TSD, Industrial Training Boards etc.
(ii) Provision for the under fives.
(iii) Falling school rolls and the 'management of contraction' (admissions, school closures, parental choice, curricular options, staff redeployment, etc).
(iv) Assessment of performance (testing procedures, identification of and provision for 'exceptional children'; changes in the role of the LEA advisory/inspectorial services).
(v) streaming, setting and mixed ability teaching.
(vi) capitation allowances.
(vii) organization, functions, administration and training of Schools/Colleges Governors.
(viii) Induction and in-service training of teachers (including 'management' training for headteachers and potential headteachers).

(ix) co-operation with School Health, Social and Employment Services (including inter-professional training).
(x) school transport.
(xi) community use of educational premises and 'chance to share' schemes.
(xii) maintenance allowances and discretionary awards.
(xiii) the role of youth and community services (with particular reference to scale and type of provision and relations with social, probation and police services, voluntary organizations, etc).
(xiv) adult and continuing education (including working with the R.Bs, promoting development with limited resources, adult literacy programmes, etc).
(xv) health and safety at work—policy and implementation in educational establishments.
(xvi) education department and LEA administrative structures, distribution of functions, management techniques, etc.
(xvii) policies and provision for boarding education.
(xviii) development of comprehensive education.

The general development of EPIC's activities is being guided by a Steering Committee with representatives from DES, SED, NFER, LEA Education Officers and the British Library. The terms of reference of the Committee are 'to advise on the development of policy and examine relevant issues in education information service development in the UK'.

The establishment of a Contact Group which, in part, equates to the SICs, is now taking place. It includes, however, interested bodies which need not have an information provision role or where they have would not be regarded primarily as Specialized Subject Information Centres.

The UK *user groups* envisaged by the Steering Committee, at this stage are:

Those responsible for policy and their support staff at senior level.
Professional and Technical Advisers (Inspectors, Advisers, Architects, Economists, Statisticians, etc.)
The staff of Research and Development Institutions.

It will be important however to recognize that the Centre will be open later to the other groups, particularly:

Teachers at all levels; and those concerned with the professional training of teachers.
Councillors, school governors, PTA-members, parents and the community at large.
The educational press.

The *types of material* likely to be useful are seen as:
Official reports of national/local experience.
Personal reports of national/local experience.
Research reports, theses and other 'grey literature'.
Abstracts, summaries or reviews of published works.
General articles and books.
Statistics and other hard facts.

Lists of research projects in progress.
Non-book teaching materials.
Ephemeral press reports.

Thus, in the first stage of development of EPIC, it is intended to concentrate some effort on studying the needs of LEAs in terms of 'policy information' as well as seeing how needs can be met from national and international services. This should enable judgments to be made about the value of EPIC and the extent to which its area of operation could profitably be widened in the UK and the EEC.

Having outlined the Commission of European Communities context and detailed the UK initiative which is both intended to meet Commission network requirements and meet current needs of the UK policy makers, it is now possible to look at the *problems* (*some* of) which have come about as a result of this dual initiative.

In summary, the Community-wide aim is to establish a three-tier structure based on the Specialist Subject Information Centres, operating in the four topic areas, within each country, co-ordinated at a National level by the National Information Unit and 'topped-up' administratively by the Central Unit in Brussels. It is hoped to computerize information exchange via this network at an early date utilizing the expertise of DG XIII. The user group is seen as *ALL* policy-makers within the educational world. The topics on which information will be supplied is limited to four pre-determined areas. In information science terms, the network is passive insofar as users have to approach it and pose questions and the additional constraint of formally published information sources (official policy documentation, journal articles, monographs and surrogates of these) seems to underpin this approach.

In the UK, while the Centre will participate actively in the network, the main initiating work will be directed to collaboration with a group of selected LEAs. The policy topics will not be limited in scope to the policy fields of the EC programme, but will be concerned with topics of current interest in the UK. Whilst the logic of this is quite clear it may be felt to present difficulties. It will imply, for instance, an attempt to understand policy-makers real information needs which it is felt are often best met not by a passive 'wait and see' question answering service but by a more active *anticipatory* alerting/current awareness programme-involving question answering but coupling this to a bulletin/newsletter service, and/or a computerized Selective Dissemination of Information (SDI) and/or On-line retrieval programme, and/or Critical Reviews. However, this need not be at variance with present Community network requirements, it should rather complement and build on these. Clearly, however, there is some difference in the concept of what an information service is and what it should provide within the EC context. The recognition of the importance of the *informal* communication network (e.g. 'the invisible college', 'the gate-keeper' etc.) is implicit in the UK approach whereas the Community network as at present envisaged is, perhaps understandably, concerned only with recorded and publicly available information—the *formal* communication network. Finally, the UK Centre hopes to develop a charging policy for its services which may set it apart from some other Centres' work (whether Specialist Subject Information Centres or National Information Units).

Other problems or criticisms of the network approach as a whole have been made and these should be aired. The reaction of British education-policy makers to proposals involving extensive computerized data-bases has been to ask who is going to check on the usefulness of the data which is stored. Furthermore, a whole range of flaws can undermine the value of the network, these include cultural differences (particularly for information exchanged internationally, or where the information is outdated) and professional/personal ones (where the author is not known to the information user or does not make his own values or perspective sufficiently explicit) and the possible distortion which can be imposed by the information processor.

I believe that it is essential to state these problems in order that an attempt can then be made to resolve or reconcile them in order to strengthen the Community network as a whole and the UK's activities as an integral part of this work.

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Company correspondence: an important information resource

Michael Haines

Latterly Head of Data Retrieval Unit, Charter Consolidated Ltd., now an independent consultant

THE PAPER 'INFORMATION MINING' (*Aslib Proceedings*, 29(1), January 1977, pp. 12–16) made reference to the company-wide correspondence filing scheme being set up in Charter Consolidated Ltd. On page 14 is the statement—'To go into details of the scheme would provide sufficient material for another paper'. This is the other paper.

Correspondence tends to be neglected by company information services, but it is very much part of the continuum of an organization's information resource. There are a number of reasons for leaving correspondence out of the information storage and retrieval operation:

1. Its generation is subject to the whims of a wide diversity of personnel with varying professional backgrounds. As a result its style, subject coverage and often physical dimensions are extremely variable.
2. Its collation should be guided by a code of practice which will ensure that the complete story of the business developments comes together on file. In practice, somewhere along the line some people do not abide by the code, and gaps appear in the record.
3. Its 'indexing' is usually done by staff who are not very conversant with information storage and retrieval techniques or details of the subjects covered. At best the indexing tends to be a little shaky; at worst it is not done at all. Detailed indexing of individual items on files is labour-intensive and requires substantial job knowledge.
4. Its subject and security classification can also be at the mercy of the whims of different professions represented amongst the company's staff. Most people are capable of filing items that pertain to the core of their activities in a logical manner; but in the fringe areas of activity, where there is likely to be an overlap with colleagues' specialities, ideas clash and the resulting arrangement of files is haphazard, to say the least, and certainly not conducive to speedy retrieval.
5. Its existence in fragmented collections in the confines of departmental boundaries sets a daunting task to anybody attempting to introduce a company-wide compatible filing scheme.

These are problems which beset many filing collections and Charter's were not atypical. Solutions can be found, but for them to be effective they must have strong top-management support. With the necessary management backing, the company-wide information service (the Data Retrieval Unit) fulfilled a brief to design a filing scheme which would overcome the shortcomings listed above.

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Objectives of the filing scheme

1. The scheme must be comprehended by the filing clerks and the staff they serve.
2. The framework of the scheme must reflect the business of the company and the way in which it operates.
3. The scheme must have a pre-coordinated classification which provides a logical 'shelving-order'.
4. The scheme should be designed in such a way that the classification and the file-identification data can be placed on a computer to eliminate time-wasting clerical effort wherever possible.

The first objective is a trite statement but worth recording, because a very sophisticated filing scheme that requires highly qualified information scientists to operate it is not cost-effective.

The second objectives ensures the emphasis is on the nature of the company's business, and not on its departmental structure. Many filing systems become fragmented and disorganized because they are rigidly identified with a group of departments that seem to operate in isolation one from the other. This of course is not the case; each department's activities bear some relation to those of other departments. For example, a company secretarial department will use and generate correspondence on financial matters; a finance department will use files that contain correspondence on technical, marketing, and company secretarial matters; and so on. A polyhierarchical classification, which deliberately does not use departmental names for labelling each hierarchy and the nodes within it, provides a framework where the whole range of the company's activities are displayed without the artificial constraints that departmental boundaries (real or apparent) impose.

The third objective ensures that the intellectual jump from 'indexing' to the 'storage location' is so obvious as to be almost a reflex reaction. If one can achieve this with the classification then it is much more difficult for the clerks to misfile an item. However, no scheme is infallible, so there will be some misfiling from time to time: it has been found, however, that when this happens the misfiling is consistent, *i.e.* all related items are grouped together although they may be in the wrong file—once you have found one missing item the others will be alongside it.

One of the most tedious aspects of administering correspondence filing is the preparation of file lists: lists of holdings; lists of files due for destruction or review; lists of files destroyed, or transferred to another location. If one can mechanize this process there are considerable reductions in clerical effort and retrieval time. The fourth objective can easily be met by entering a standard set of data identifying each file on to a work-sheet (Figure 4); these data are then coded and entered into a computer programmed to produce the various lists described later. The filing clerks make the natural language entries and the supervisor does the coding and checks the data at the same time.

The classification

In most companies' correspondence, all items can be broadly considered as referring to a Company, or a Country or a Commodity. This rather sweeping statement is badly in need of some supporting argument; so consider each of these main categories in turn.

1. *Company category*

If one defines Company as including registered company names, project or joint-venture names (where a registered company has yet to be formed), institutions, national and international organizations, it is easy to perceive that much correspondence concerns business with another company—as a client, supplier or associate. This being so, all such items can be assigned to the Company category.

2. *Country category*

Where the business referred to in the correspondence cannot be identified as pertaining to a specific company; the item has to be assigned to some other category. In this case it is often possible to relate the information contained in the item to a country. Country is defined as covering: countries *per se*, geographical, political, and in Charter's case, geological, regions; examples are, respectively, Spain, Iberian Peninsular, Soviet Bloc, Canadian Shield.

3. *Commodity category*

It is now pretty obvious that the commodity category comes as the only remaining choice after a process of elimination. However there are items of correspondence that deal with a product or raw material, so this category does appear in its own right. It is not uncommon to find that memoranda or telexes deal with business pertaining to a specific commodity.

The way in which these categories have been defined indicates the order of priority for assigning an item of correspondence: first see if it fits into the category Company, if not then into Country, lastly into Commodity.

4. *Subject headings*

A polyhierarchical subject classification permits further subdivision of the files under each of the three main categories. Fourteen hierarchies were constructed to cover the gamut of Charter's activities:

(1) Company & Statutory Management
(2) Financial Management
(3) Propositions
(4) Government
(5) Geology
(6) Evaluation
(7) Mining
(8) Processing
(9) Township
(10) Essential Services for Mine & Township
(11) Marketing
(12) Non-mine Services
(13) Personnel
(14) Publicity

Any of these fourteen hierarchies can be used to subdivide Company, or Country, or Commodity, but in practice not all have been used for each of these main categories, *e.g.* Company & Statutory Management, and Township are not used for the Commodity files.

A major decision, taken when constructing these hierarchies, was to subdivide to not more than five levels below the main subject heading. Various influences effected this decision:

—If one subdivides too far, some of the node labels of the lowest levels start to bear an uncanny resemblance to those of the highest levels, a strange phenomenon, and one that would easily create confusion in the minds of the clerical staff.

—Correspondence is part of an on-going business operation, and if subdivided too finely will cause difficulties in comprehending the state-of-the-business at any particular time. The dictum of 'file at the highest level conducive to ease of reference' has been adopted: this applies especially in the initial stages of a 'project', when the relatively small volumes of correspondence in each subject area are of greatest value when filed together.

—With a multitude of small divisions one is going to end up with a greater volume of file covers than items held between the covers!

This degree of subdivision is satisfactory for most of the correspondence. There are, however, circumstances when large projects, involving thousands of different components that go to make up a mine complex, generate enormous volumes of paperwork which have to be subdivided further. In these cases a specific project scheme of file-classification can be tacked on to the bottom of the relevant hierarchies. The specific project schemes subdivide the correspondence to match the components almost to the last nut and bolt, and have wider applications than just for filing, such as stores control systems and purchasing programmes.

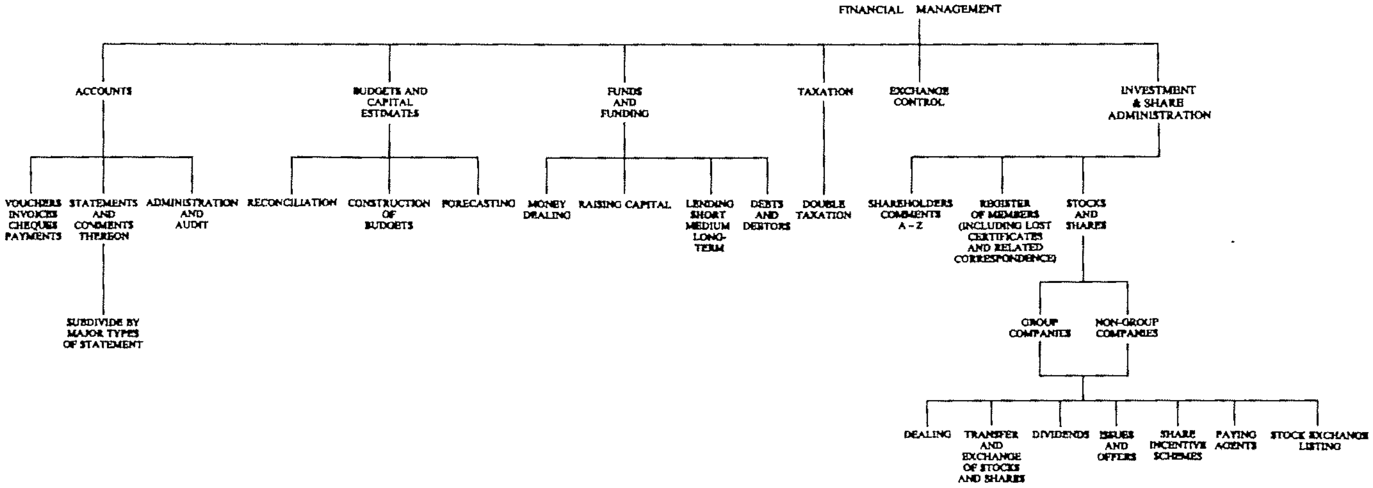
Hierarchies 3 to 10 are very much specific to mining, and for the purpose of this paper can be presented by a brief description. On the other hand hierarchies 1, 2 and 11 to 14 are applicable in a much wider business context and are worthy of more detailed treatment.

Hierarchies 3–10

3—*Propositions.* These are potential new ventures which might lead to a new mine, the creation of a new company or a new manufacturing process. The business is of an exploratory nature and a detailed breakdown is not necessary, because if the venture is worth pursuing the consequent activities are covered by other hierarchies.

4—*Government.* For any organization establishing operations abroad, government legislation, negotiation with governments and potential government participation are all features likely to appear in the correspondence.

5—*Geology.* In new mining ventures geological exploration plays a major part in the early assessment of the viability of the project, so the various exploration techniques are catered for in the classification. In addition, geologists are involved in the development of the mine once it has been opened up: subject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SUBDIVIDE BY MAJOR TYPES OF STATEMENT
RECONCILIATION
CONSTRUCTION OF BUDGETS
FORECASTING
MONEY DEALING
RAISING CAPITAL
LENDING SHORT MEDIUM LONG-TERM
DEBTS AND DEBTORS
DOUBLE TAXATION
SHAREHOLDERS COMMENTS A - Z
REGISTER OF MEMBERS (INCLUDING LOST CERTIFICATES AND RELATED CORRESPONDENCE)
STOCKS AND SHARES
GROUP COMPANIES
NON-GROUP COMPANIES
DEALING
TRANSFER AND EXCHANGE OF STOCKS AND SHARES
DIVIDENDS
ISSUES AND OFFERS
SHARE INCENTIVE SCHEMES
PAYING AGENTS
STOCK EXCHANGE LISTING

headings of Reserves Delineation and Mine Development are in this hierarchy.

6—*Evaluation.* These can take the form of technical, financial, legislative, political and economic assessment, using specialized techniques which justify a grouping of the associated correspondence under a separate classification hierarchy.

7 to 10—*Mining; Processing; Township; Essential Services for Mine & Township.* These are all major areas of activity involved in the business of producing minerals for subsequent manufacture into a great variety of products. It is these hierarchies to which specific project schemes of file-classification are added to provide finer subdivision if required.

Hierarchies 1, 2 *and* 11 *to* 14

Tree diagrams for 1 *Company & Statutory Management*, and 2 *Financial Management* hierarchies are reproduced in Figures 1 and 2.

The only portion of these that needs some explanation is the use of the terms Group and Non-Group Companies on the right-hand side of the Financial Management chart. Charter Consolidated Ltd. is part of a large diverse group of companies, and it is useful to make a distinction between business conducted with associates/subsidiaries and with companies outside the Group.

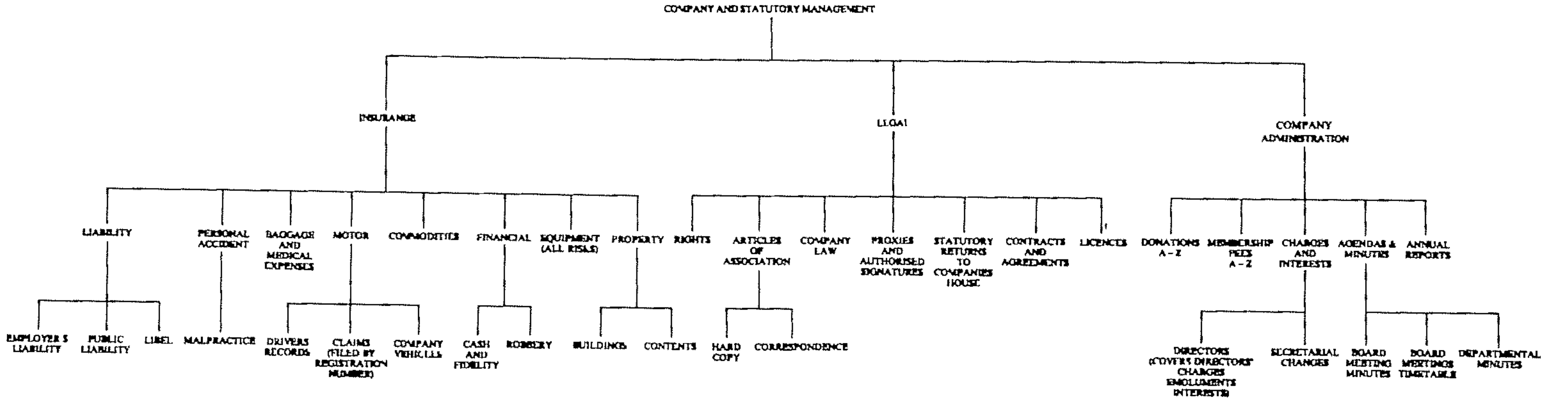
It is worth mentioning here that a fair proportion of the correspondence on Group matters was found to refer to the whole Group regardless of the nature of each individual company's business: the pseudo-company name of 'Greater Group' was introduced to bring all such correspondence together. This device of coining a name within one of the major categories of Company, Country, Commodity can be very useful, especially when applied alongside the dictum of 'file at the highest level conducive to ease of reference' (3.4): it must, however, be carefully controlled. It can overcome the problem of trying to fit an item forcibly into the subject classification, and most important of all obviates the use of the file heading General, or Miscellaneous—words that are the curse of every filing system!

Hierarchy 11—*Marketing*

Marketing does not form a large part of Charter's activities so only one level of subdivision is used, with a breakdown into Marketing Agents, Export Control, Production Forecasting, Price Forecasting and Sales.

Hierarchy 12—*Non-Mine Services*

A title which makes sense in a mining context, but in other environments would probably be just Services. Essential Services (such as Water, Power, Catering), and Construction Services for Dwellings and Offices come in this hierarchy. In addition, for Offices, a subdivision—Communications—is used, which includes Messengers, Post Office, Computers, Information Services and Security Systems. If this at first sight seems a completely unwarranted subjugation of Information Services and Computers, let me hasten to remind you that we are creating a hierarchy which provides niches for business correspondence, and deliberately does not reflect the departmental structure of the organization.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LIABILITY
PERSONAL ACCIDENT
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MOTOR
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MALPRACTICE
DRIVERS RECORDS
CLAIMS (FILED BY REGISTRATION NUMBER)
COMPANY VEHICLES
CASH AND FIDELITY
ROBBERY
BUILDINGS
CONTENTS
HARD COPY
CORRESPONDENCE
DIRECTORS (COVERS DIRECTORS' CHANGES EMOLUMENTS INTERESTS)
SECRETARIAL CHANGES
BOARD MEETING MINUTES
BOARD MEETINGS TIMETABLE
DEPARTMENTAL MINUTES

Training Courses	See PERSONAL TRAINING OF STAFF
TRAINING OF STAFF	See PERSONNEL
TRAINING POLICY	See PERSONAL TRAINING OF STAFF
Transfer Fees	See FINANCIAL MANAGEMENT INVESTMENT & SHARE ADMINISTRATION STOCKS & SHARES TRANSFER & EXCHANGE OF STOCKS & SHARES Differentiate between Group & Non-group companies
Transfer Routes	See FINANCIAL MANAGEMENT INVESTMENT & SHARE ADMINISTRATION STOCKS & SHARES TRANSFER & EXCHANGE OF STOCKS & SHARES
TRANSFER (of Shares/Stock)	See FINANCIAL MANAGEMENT INVESTMENT & SHARE ADMINISTRATION Fo Individual, see REGISTER OF MEMBERS For Company, see STOCKS & SHARES TRANSFER & EXCHANGE OF STOCKS & SHARES
Translations (services)	See NON-MINE SERVICES PROPERTY OFFICES A-Z COMMUNICATIONS INFORMATION SERVICES

All aspects of Travel and Transport services come under a subdivision of Non-Mine Services; Import/Export Duties and Regulations are included here.

Another subdivision, headed Buying, is used for all buying not associated with a specific mining venture.

Hierarchy 13—Personnel

With a large proportion of expatriate personnel retained and being recruited, as well as a UK-based staff of many hundreds, the Personnel activity is large and quite complex. The most detailed subdivision in all the hierarchies occurs here: the classification designed by the Personnel department, and successfully operating for a year or two, proved to be satisfactory, and so was adopted with only minor modification by the Data Retrieval Unit. Even here, although there are sixty-nine node labels, subdivision does not occur below the third level under the main hierarchy-heading.

Hierarchy 14—Publicity
This covers External Information, such as Press Releases and Advertisements; Publications produced by the Company; Educational Information; Visits and Entertainment.

5. *Index to the Hierarchies*

An alphabetical index to the Filing Classification is used by the clerks. It currently contains nearly 800 entry terms, which include all the node labels from the hierarchies, plus (and these are in the majority) any other subject name that might appear on an item of correspondence or occur to a clerk when sorting the mail for filing. A sample page appears in Figure 3: the upper-case entry terms being the hierarchy node labels, and the lower-case entry terms being the 'other subject names'.

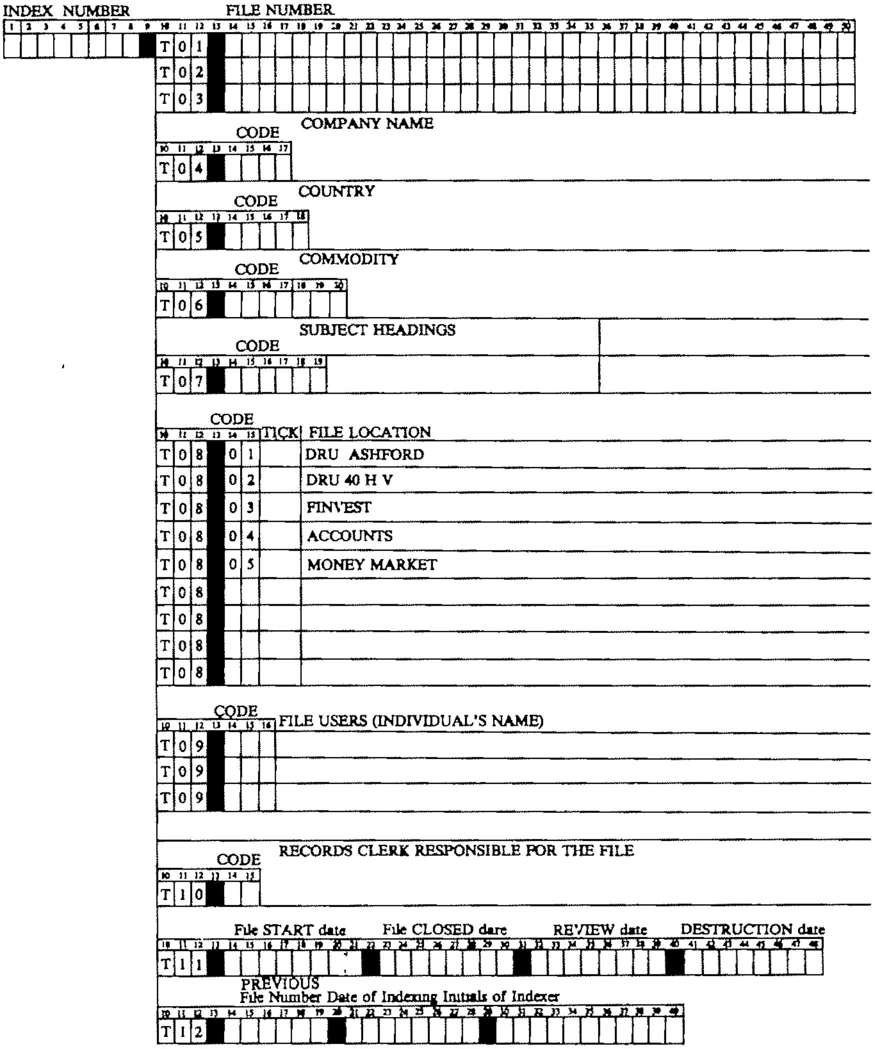
The entry terms lie on the left of the page in conventional index format. The references to the right of each entry term have informational and instructional roles for the guidance of the clerks. The presence of all the super-division node labels for each entry term provides an unequivocal setting for the subject, but sometimes additional instructions are required in the form of scope notes or definitions: on occasions direct 'this is filed in the . . . collection' instructions occur. The alphabetical index thus acts as a simple thesaurus and a code of filing practice.

It is obvious that such an index will always be growing. The generous spacing between the entries allows temporary hand-written insertion of acceptable additions. The first version of the index was produced on a programmable automatic typewriter with magnetic card storage: up-dating is greatly facilitated by this mechanization. After the first year of use the rate of annual additions to the index dropped from about 200 to forty. Strict control is exercised over suggested additions or amendments; they are discussed with users and Data Retrieval Unit colleagues to ensure correct definition and correct placing in the relevant hierarchy.

File data input and output

1. *Input*

The input work-sheet shown in Figure 4 contains all the headings necessary to identify each file and provide a database for subject searching. As mentioned previously, the clerks use natural language entries for completing the form, but these are coded for input into the computer. The codes concentrate the storage in the database and also permit varying degrees of generality/specificity in the search and listing routines.



INDEX NUMBER FILE NUMBER

T01
T02
T03

CODE COMPANY NAME
T04

CODE COUNTRY
T05

CODE COMMODITY
T06

SUBJECT HEADINGS
CODE
T07

CODE		TICK	FILE LOCATION
T08	01		DRU ASHFORD
T08	02		DRU 40 H V
T08	03		FINVEST
T08	04		ACCOUNTS
T08	05		MONEY MARKET
T08			
T08			
T08			
T08			

CODE FILE USERS (INDIVIDUAL'S NAME)
T09
T09
T09

CODE RECORDS CLERK RESPONSIBLE FOR THE FILE
T10

File START date File CLOSED date REVIEW date DESTRUCTION date
T11

PREVIOUS
File Number Date of Indexing Initials of Indexer
T12

It would be ideal if each item on the file could be indexed, but this is too labour-intensive for the Data Retrieval Unit's work-load and generally the cost effectiveness of such a process is suspect; so indexing a file is the next best thing.

2. *Output*

Along with the file data on the computer are kept dictionary files to convert codes to natural language for output listing. The codes for the subject headings and other data fields can be referenced from the printout of the dictionary files.

Boolean logic searches can be done on an ad hoc basis, but regular output is in the form of the following lists:

—*a master list of all files* maintained by the Data Retrieval Unit;
—a list of *all such files in a filing office*, for each filing office;
—a list of *all files* that are *an individual clerk's responsibility* for each clerk;
—*files due for destruction*, listed under the name of the Charter member of staff who is responsible for the area of business that these files cover;
—similar lists of *files due for review* as to whether they should be destroyed or kept for a further period.

The first three lists are up-dated regularly on a frequency that has reduced since the completion of transfer of all files to the new scheme. Unless there is a sudden appearance of new collections of files in the scheme, the optimum up-dating frequency appears to be quarterly.

The last two lists are extremely tedious to prepare manually, and used to be done at each year end. However, the ease of producing them on the computer means that semi-annual listing is no problem, and this does reduce the time the authorizing member of staff has to spend on any one list.

Conclusions

The system described has been operating on an increasing scale over a period of three years and is well suited to the present activities of Charter Consolidated. A collection of files is a dynamic system, subject to the influences of business developments; any such system must be flexible enough to keep pace with variations in the company's activities. To this end it is a considerable help to have the parameters that identify each file in a computer-held database.

An attempt has been made to treat the topic of filing classification in as general a way as possible in order to make it widely applicable. It is, however, the system used in one company that is the subject of this paper, so some techniques used will not have universal applicability; but it has been designed to cope with all situations likely to arise, as far as one can predict. A test of its flexibility arose recently when some specialized financial investment files were surveyed prior to proposals being put forward for an integrated filing system: all the files were subsequently slotted into the Data Retrieval Unit scheme with no distortion of the classification.

Acknowledgments

The permission of Charter Consolidated Ltd, to publish this paper is gratefully acknowledged, as is the considerable help of colleagues without whose tireless efforts the filing scheme would never have come into being.

BRIEF REVIEWS

ANDERSON, I. G., *ed.* Directory of European associations; part 2: national learned, scientific and technical societies. Second ed. Beckenham, Kent, C.B.D. Research, 1979. 412 pp. £31.50 (ISBN 900246 29 4.)

The second edition of this directory updates the wealth of information concerning the interests, activities and publications of national learned organizations in all scientific and technical areas in continental Europe. This edition includes Iceland, Malta and Cyprus among the countries covered, and continues with the same subject arrangement as the first edition, allowing easy appraisal of all the associations dealing with any particular field of activity in the various countries. The format of the entries also remains the same, with the valuable addition of identification of the international organizations to which a national organizational is affiliated. This information, and the details of publications, addresses, membership data and special activities such as conferences, are all presented in clear and concise entries. The first edition of this directory has already established itself as an important reference source of a very high standard; the constantly changing nature of the information listed makes the second edition an essential item of any basic reference collection.

BOEHM, KLAUS *and* MORRIS, BRIAN. Who decides what: the citizen's handbook. London, Macmillan, 1979. 485 pp. £12. (ISBN 0 333 19755 0.)

On first perusal, this book would appear to contain answers to a number of the sort of problems asked of a reference librarian, and in a wide range of cases this is correct. The guide contains much information on a diverse number of topics ranging from legislation covering wine production to the licensing of credit reference agencies. It does have some gaps in coverage; any average citizen may wish to know whether there is legislation covering the use of children's car seats, how to become a magistrate or where one may see patients. For those subjects for which entries exist, brief background information is given, followed in most cases by referral to a relevant authority or publication. The book is in three parts: the main text and two indexes. The separate address index, although unheaded, is extensive and useful; however the second index (subject) could usefully have been incorporated into the main text of the work with 'see' references. A casual user may not notice this subject index, and as a result may miss entries in the main text. It is not easy to imagine the typical user of this book; it is too expensive for the average citizen to purchase for use in his own home, and if he were to approach his local reference library or information bureau in connection with any of the points the book covers, the answer could be supplied from other sources and in greater depth. Despite these criticisms, the potential use of this book should not be underestimated, and it will be a useful source for a non-specialist starting any search for information.

Guide to government department and other libraries and information bureaux. Twenty-third ed. London, The British Library, Science Reference Library, 1978. 92 pp. £3. (ISBN 0 904654 16 8.)

The twenty-third edition of this guide is a valuable aid to anyone involved in inter-library loans. The format has not changed and the entries are arranged by subject interest, with an index to the subjects as well as an organization name index. Each entry contains an address, telephone number and name of the librarian, together with detailed information about stock, subject coverage and availability. The coverage of this edition is greater than that of the previous editions although it by no means covers all libraries in the United Kingdom. However it still gives a good overall view of the major libraries in this country.

Letter to the editor

MICROPROCESSORS

I have read P. William's article in the April 1979 issue of *Aslib Proceedings*, and welcome his attempt to inform the profession of important developments in computer hardware costs due to the development of microprocessor-based equipment, and the consequent impact upon potential computer application in library and information systems.

It is true that at the end of his paper some reference is made to the cost of program development. In my view it is rather understated. Hardware costs are still continuing to fall, in terms of the capability per £ spent. To realize this capability an increasing proportion of the final bill will be spent on developing and maintaining software. In nearly all cases a program will have to be written for a particular application. There are several reasons for this. So called medium-level languages supplied with much of the presently available hardware are in reality only sub-sets of those languages. This causes problems for portability of packages where they exist. There are very very few if any library-task oriented program packages available for micros. There are very many different microcomputers available, although there are comparatively fewer microprocessor chips used inside them the variation in operating systems, monitors, and input/output routines are very many. So much so that potential users need help in several ways when considering a specific task:

1. in defining the application—is it suitable for a microcomputer type solution?;
2. in choosing the machine configuration—what is the best combination of hardware to do the task?;
3. in defining the software requirements;
4. in getting the software written—in-house or by some individual or software house. Either way it can be very expensive and will represent an increasing proportion of overall costs if hardware costs continue their downward trend.

What is also clear is that some more general help can be provided through the investigation of potential applications and the development of portable software packages for such applications. It is certain that experts offering advice in this area must do so with a clear understanding of library problems. If my experience with mainframes and minicomputers is anything to go by these experts are not to be found in the computer industry.

M. J. ROWAT
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Communication—the new Community dimension

Lord Thomson of Monifieth

Chairman, The Advertising Standards Authority,
and former EEC Commissioner

Paper presented as the 12th Aslib Annual Lecture at the Royal Aeronautical Society, London, 13th June 1979

IT IS SAID that the British people have become either hostile or indifferent to the European Community. The level of poll at the first European General Election which has just taken place appears to bear this out. Is it true? If it is true—why is it so? Is it a failure of communication? In this Aslib Annual Lecture I want to try to answer these questions and to explore this new European Community dimension in the field of communicating public policy.

It has been my general experience as a working politician that when things go wrong it is almost a reflex action to make communications the scapegoat. When a government goes through an unpopular phase it is said that this must be because it is failing to communicate the realities of the problems and the excellence of the government's proposals to deal with them to the general public. When a government gets into that mood, it has equally invariably been my experience that it is unpopular not because the public fails to understand its policies, but because it dislikes and disagrees with them. Governments tend to be like husbands who complain to their mistresses that their wives do not understand them, when the sad truth is that their wives understand them only too well.

Is it the same with the European Community? Is the reason for the apathy and hostility in Britain that the public now understands only too well what the Community is about and simply doesn't like it?

I do not believe that dislike of Community policies was the main reason for the low poll. If that had been the case there would have been a rush to vote for the many Labour candidates who made no secret of their hostility towards the Community and all its works. And that certainly did not happen.

It is true that one reason for the negative state of public opinion in Britain about the Community is a growing awareness that Britain, as one of the poorer countries of the Community, is beginning to become the biggest net contributor to a budget which is excessively devoted to meeting the cost of agricultural surpluses. But this British obsession—that we have become the poor man of Europe being exploited by cleverer Continentals—besides being sadly lacking in pride, itself reflects the serious distortions of the Community's image that have been allowed to grow up in Britain.

The purpose of this lecture is to examine why the communication of a

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balanced picture of the Community should be so difficult in Britain, rather than to rehearse once again the political pros and cons of British membership of the Community. It is, therefore, sufficient for my purpose, as regards the central British critique of our budgetary contribution, to recite the following facts:

- The true perspective is that the Community budget represents 0.7 per cent of the Gross Domestic Product of the Community; the British contribution to it is 2 per cent of our public expenditure.
- British governments (I use the plural advisedly) have always recognized that because of the Common Agricultural Policy there would ultimately be a budgetary price to pay for entry, but it must be set against the less quantifiable economic and political benefits of being part of a Community with the strength of a Continental economy and able to negotiate in world affairs as a single entity.
- The last Labour government renegotiated these anticipated budgetary problems, recommended the results to the electorate in a referendum and gained a two-to-one majority which they pledged themselves to accept as the end of the argument about British membership. It hardly lies in the mouth of the Labour Party now to threaten a fresh withdrawal if they do not get satisfaction over this issue.
- For six years, under our transitional arrangements for membership, we have been part-payers of our budgetary contributions and full beneficiaries, without ever giving the Community proper credit for the £2,500 million of grants and attractive loans. We have cried 'wolf' so often over the budget that, now that the wolf is at the door, our partners believe that it is merely a domestic party-politics dogfight.
- If the relative decline of the British economy has been much greater than anybody foresaw in 1970, the fault, dear voter, lies not in our EEC but in ourselves.

The issue now is, why has the Community been allowed to become the scapegoat for our own economic failures? Could a more effective Community communications policy have prevented this—or at least mitigated it?

I believe, as I shall seek to show, that the main fault lies in Britain, not in Brussels, that there has been a serious abdication of political leadership over Community issues within the UK. But there are several obstacles to an effective Community information policy that belong to Brussels and affect the Community as a whole.

The first is the simple fact that the European Community is a complicated unprecedented multinational institution. It has been said of the elephant that though it is hard to describe, you can always recognize one when you see it. For the professional communicator the Community is worse than the elephant, since it is not only hard to describe, but often equally hard to comprehend when you watch it at work. Both for the information officials of the Community, and for the journalists seeking to encapsulate the late-night convolutions of the Agricultural Ministers in a snappy story, the Community is a formidable, forbidding technical problem in the art of communications.

But the Community, like many a human institution, is often its own worst enemy. It has an infinite capacity for making the simple complicated and, since it does this with an openness unknown to national governments and at infinite length, there is maximum opportunity for letting cats (imaginary or otherwise) out of bags, drawing shoals of red herring across the Community scene and setting the maddest of March hares running in all directions, without a hope of harassed Community information officials ever being able to catch up with them. The myths that grow up are myriad and hydra-headed. No sooner is one slain than another takes its place: Euro-beer, the extinction of the English apple, the interference with the sex life of the English hop, the abolition of the traditional uneviscerated Christmas turkey—if I have strangled that mythical turkey once, I have done it a dozen times and still it keeps flapping its wings!

Of course, there is no smoke without fire. The very openness of Community government provides a fertile seed-bed for myths to grow. The bright idea of some Commission backroom boy is floated as a trial balloon without his departmental chiefs knowing in advance. Legislative proposals which would be discussed behind closed doors in Whitehall are aired in a network of consultative groups, and even the supposedly secret Commission debates tend to be reported blow by blow. It would be a healthy process of open government if only the public could be made to appreciate the difference and the long time-scale between an idea, a Commission proposal and a Council decision.

Most daft ideas gradually disappear, like the smile on the face of Lewis Carroll's Cheshire cat, before they become official Commission proposals. But the Commission machinery is cumbersome, and sometimes the Commissioners, sitting in their thirteen-storey eyrie preoccupied with major issues like freezing CAP prices or initiating an energy policy, nod when it comes to a proposal to harmonize the noise level of motor mowers from Greenland, where no igloo is complete without its motor mower, to Sicily, where the problem is to get the grass to grow in the absence of water.

There is an important role for highly selective or optional harmonization, giving the exporter one Community set of regulations instead of nine national sets and giving the consumer wider choice and greater safety. But I was greatly relieved to hear the Commission President, Roy Jenkins, say robustly to the Confederation of British Industry the other day that the Commission had set its face firmly against any policy of 'If it moves, harmonize it.' If the Commission becomes a good deal more rigorous and selective about harmonization, it will make the task of projecting the Community infinitely easier.

Apart from these general considerations, there are some special technical and political problems of Community information policy. There is the initial obstacle that we are most of us to a remarkable degree prisoners within the high walls of national public opinion.

The communications revolution is supposed to have produced a global village, but we all remain significantly nationally insulated. This is not a reflection of a peculiar British insularity. It is true of European countries in general.

There is a story of a Corsican deputy to the French Assembly in the nineteenth century who sought to emphasize to his colleagues that Corsica was an island. 'Moreover,' he said, 'it is an island entirely surrounded by water.' France and

Britain, in my experience, are both great European islands; the main difference between us is that Britain is an island entirely surrounded by water.

When I was a member of the European Commission I used to have on my desk each morning a summary of the day's press in each of the member states with photocopies of the principal articles of Community interest. It was fascinating to note how self-contained and separate they were. Even if they described the same event—perhaps a meeting of the Council of Agricultural Ministers—this was true. It was sometimes as if the reporters had attended entirely different meetings. The British Minister of Agriculture might be reported as giving a triumphant verdict on the meeting quite contrary to the verdict of the German Minister to his national press. They could hardly both have had victories over each other but the interesting thing was—and is—that they got away with it. German reports are for German consumption, British reports for British consumption, and never the twain shall meet—perhaps fortunately for national politicians.

Associated with this separatism of public opinion is a prickly political sense of national sovereignty where the operation of the Community's information services are concerned. This is the point at which I shall try to describe briefly the structure of those services—I use the plural advisedly for one of the complications is that the image of the Community is projected by three principal but separate information organizations—those of the Commission, the Council of Ministers, and the Parliament. Though they are all professedly devoted to the objective of creating a Community which will be able to speak with a single voice in world affairs, they do not always speak with a single voice on current Community affairs.

The Commission, as you know, has the duty under the Treaty of making the proposals for Community development; the Council of Ministers of taking the final decision on these proposals; and the Parliament of recommending amendments and improvements to the Commission's proposals, to both Commission and Council. In other words, the Commission proposes; the Council disposes; and the Parliament seeks to impose its views on both.

The Commission's information department has two separate divisions. There is the Spokesman's Office, which has the daily direct relations with the large and highly professional Community Press Corps. Then there is the Directorate General, responsible for general information policy. The importance the Commission attaches to information policy is underlined by the fact that both the Spokesman's Office and the Directorate General come under the direct responsibility of the President. The Commission has a substantial information office, under a senior official, in each national capital.

Unique to the UK are regional information offices, in Edinburgh and Wales and soon in Belfast. I took an active part in establishing these when I was Commissioner for Regional Policy and have been rather disappointed that so far other countries have declined the offer of similar regional facilities.

One of the handicaps the Community faces in projecting its image is the danger of over-centralization. I early came to the conclusion that good news about the Community was often local or regional news. When the Commission periodically announced its latest allocation of grants from the Regional Fund or the Social Fund, the global sum of many millions usually rated a few lines on an inside page of the *Financial Times* and the other 'heavies'. But a few hundred thousand pounds for a Northumbrian water scheme, or a Welsh industrial estate, or a Highland pier, was front page news in their local newspapers—so long as they were given the details in good time. In due course bulging files of cuttings from the provincial press proved how correct this proposition was, but I was astonished and fascinated at the difficulties there were in gaining acceptance of this simple idea.

There was strong resistance from the highly centralized and highly sensitive Press Corps in Brussels. All hard news about the Community should be distributed through them; no hard news should erode that monopoly by going out through the Commission's national or regional offices. Their duty was to provide longer-term background material and respond to enquiries. The fact that the provincial press and broadcasting had minimal representation in Brussels was considered irrelevant. I remember asking the editor-in-chief of one of our great newspaper chains how many journalists he employed in the House of Commons to cover the news of local interest which pours out of Parliament. He thought there were around twenty. How many did he have in Brussels? He admitted he had only one correspondent attached to his Fleet Street national daily, with no responsibility for provincial coverage.

In my time in Brussels there was long argument about having a Press Association correspondent there to cover news of domestic and provincial interest, as distinct from the international diplomatic and political side of the Community admirably covered by the Reuters correspondent. This episode illustrated one of the most difficult psychological adjustments for the British—communicators and politicians alike: Brussels might be 'abroad' but the European Community was a long way from being 'foreign affairs', the proper and mysterious province of professional diplomats and foreign correspondents. The Community was in fact increasingly an extension, a new dimension in home affairs.

A separate obstacle to disseminating locally the good news of the wide variety of grants and loans made by the Community came from national administrations. They were reluctant to see the Community gain credit for activities which in the past had been a national prerogative, and they were nervous lest news of regional grants would produce a political backlash from the areas passed over. As I have said, the Commission has managed to overcome these problems to a greater or a lesser degree, depending on the member states, but the battle goes on.

Alongside the Commission's information machinery there exists that of the Parliament. It has the distinctive duty of publicizing the Parliament's attitude to the Commission's proposals. Parliament and Commission have, however, so far been allies reflecting the desire for Community development in the face of the national interests in the Council of Ministers. The Parliament also has its own office in each national capital and in Britain it and the Commission operate under the same roof and have co-operated closely.

The information activities of the Council of Ministers are quite a different story. Apart from a modest publications department producing background material, it has no spokesman's department like that of the Commission. It cannot have. Not even a Solomon amongst civil servants could aspire to speak for the nine national Ministers. It is left to the President-in-Office at the end of a Council session to attempt to sum up the decisions or, often, lack of decisions at the meeting. It was Dr Garret Fitzgerald, then Irish Foreign Minister and the most brilliant of Presidents, who remarked wryly when someone complained about the empty banality of his report that the Council of Ministers was the only body he knew where the view of a minority of one always prevailed.

But while the President-in-Office is struggling to draft his platitudes, a fascinating exercise in Community information policy is taking place round the Council table. One by one the Ministers slip out of the Council Chamber as if for a cup of tea. Their time of departure can be determined in advance by the *cognoscenti* who are aware of the deadlines in the newspaper offices of the various member states, for the Minister's destination is the press room on the ground floor. There they give, mainly to the journalists of their own country, their own *ex parte* accounts of the Council meeting. As I have said earlier, it is remarkable how different these accounts are and how rarely they are compared.

Much of the Community's damaging image as an endless round of late-night recriminatory meetings between national Ministers arises from this curious procedure. Of course conflict is always news; compromise isn't. The fact that on the great issues, after the ritual of fighting one's national corner vigorously and visibly, a compromise reconciling national interests eventually emerges, rarely attracts the same publicity as the punch-ups. Given the nature of news-gathering and the present state of development of the Community as a grouping of national states, it is not easy to suggest solutions on the information front. It would, however, help a great deal if the main debates in the Council of Ministers were to be open to the press and the public. (The critical compromises are invariably made behind closed doors in smoked-filled rooms in any case.) It would also, I believe, help if the Commission were to be a good deal bolder during the course of the Council debates in giving clear background briefing of a Community character against which the correspondents could test the national sentiments expressed by the Ministers.

This takes me from general problems of communication within the Community back to the problems special to Britain—and to some extent to Denmark. There is no doubt that the regular public opinion surveys taken by the Commission show that, apart from Denmark, the level of commitment to the Community is lowest in the UK. It is not that on the mainland there is a starry-eyed enthusiasm for the Community. It is not true to say that in the cafés on the canals of Amsterdam or in the Grand Place in Brussels they talk of little else than the European Monetary System or the Monetary Compensatory Amounts. They simply tend to take the Community for granted, as part of the general framework of government like their national administrations, necessary, useful and fallible. It is only in Britain (and in Denmark) that the permanence of Community membership remains in question. Why? Is it primarily a problem of communications? Could it be changed if only the Community information services had more money to spend on publicizing the Community or to operate more effectively?

I do not believe this is the problem. No doubt the estimable Eurocrats in the

London information office of the Community would welcome a bigger budget, and no doubt they would be the first to admit that they are guilty of their share of sins of omission and commission.

However, the problem lies not in the Community's outpost in London, but right at the heart of British politics in Westminster. The Commission's information budget for the UK is tiny compared to the annual budget of the Central Office of Information without even counting the cost of the many departmental information machines. If public expenditure on information about Britain's future in the Community is to make a contribution, the major role must be played by the national state.

But, for the last five years, the Labour Government has given no priority to emphasizing the importance of making a success of British membership of the Community and of the Community's role in world affairs. We live today in a highly centralized industrial society with a tightly knit communications network. In the British case this is aggravated by the dominance of Fleet Street and a handful of national newspapers. It is government that sets the climate of public opinion. It is what Ministers say in public and in private about the European Community that sets the tone of national debate, that determines what the senior civil servants and departmental information officers say, that influences the attitudes of the leader-writers and the TV pundits. For five years the Labour Government, in that most typical phrase of the times, adopted a low profile over the European Community. And to a large extent the new post-Heath Conservative opposition tended to lie low, too. They refused to risk giving any electoral ground to their opponents. With no leadership about the historic advantages of Community membership the way was clear for the grousers and the grumblers to engage in a steady drip, drip, drip of denigration. It did more good in the leadership stakes in both Government and Opposition in those days to play John Bull at the despatch box at the expense of practical results in the ongoing Brussels negotiations.

This attitude did not arise from any conviction that Britain had made an error in remaining in the Community at the time of the 1975 referendum, or that some big change had taken place that justified a change of position. That would have been intellectually respectable.

The ambivalent attitude taken up by the government owed little to any intellectual doubts about membership of the Community and much to an ideological division within the Labour Party, and indeed within the Labour Cabinet. Patching up party unity was considered a great deal more important matter than the historic issues associated with British membership of the Community. Britain might abdicate her traditional place at the top table alongside France and Germany of creating a new European order, but nothing must be done to rock the party boat.

Party unity, what sins are committed in thy name! The pro-Europe majority in the last Cabinet refrained from promoting a positive climate of opinion about the Community for fear of provoking the anti-Community minority. The 'antis' who were supported by a majority in the National Executive Committee shared no similar restraint. They were left with a free field to snipe and snarl.

In the name of party unity the government refused to commit the party to the plan for a fairer electoral system which it itself supported. The Conservative leadership took an even more negative attitude to Liberal proposals for proportional representation. As a result Britain has now contributed a grotesquely distorted delegation to the European Parliament. In the name of Party unity the National Executive was allowed to usurp the Parliamentary Labour Party's role in drafting the election manifesto. Its thinly veiled threat of future British withdrawal had all the petulant credibility of the young man who told his sweetheart that unless she did what he wanted he would blow his brains out and spoil her new dress. The political correspondent of the *Observer* reported the other day that 6 million election leaflets had been destroyed because they said 'Labour for Europe' and replaced by ones which read 'Labour and Europe'. In the name of Party unity and with Conservative acquiescence, the information services of the Community in Britain were discouraged from pulling out the stops in a colourful and imaginative public relations campaign to excite public interest in the European elections. Instead, the large budget of £1 million was spent largely on the dullest and most neutral of 'official public service' advertising. And, in the event, even that was limited in its operation by the General Election.

The truth is that the task of persuading ancient European nations to pool limited but important aspects of their sovereignty in a single Community is an immensely difficult one. It involves painful changes in familiar and cherished national ways of conducting both public and private business. It requires a patient search for necessarily complicated compromises, and a willingness to explain to the layman why these often irritating alterations in our national procedures are a necessary means to the achievement of great long-term goals—the creation of a Continental-scale economy and a political unity that are our best guarantees of future peace and prosperity. The ordinary citizen earning his or her daily living cannot be expected to follow the technical details of Green Pounds and European Currency units. It requires political conviction and vision, and political will of a high order, if the nations of the Community are steadily to build a more united Europe.

The present state of public opinion in Britain about the Community is not a failure of information policy, but of political leadership. It was dramatically underlined by the failure of both Labour and Conservative leaders to campaign in the European General Election on anything remotely like their personal commitment in the national General Election. It was largely left to the Conservatives and their second and third elevens of estimable but obscure grassroots candidates to try to make their mark on the unmanageable and mammoth Euro-constituency.

The Liberal leadership, with heroic consistency despite the electoral dice being loaded against them, fought the campaign properly. It was little wonder, if the nation's leaders refused to take the Euro-poll seriously, that the ordinary voter followed suit.

The new Government claims it will do things differently. It says it will pursue the European ideal while vigorously fighting Britain's corner in matters like CAP and the budget. We shall see. It is certainly the better way to seek results in Europe. But it will have to prove it is ready to pursue its European policy with more leadership and conviction than it showed in conducting its election campaign. We should not underestimate the problems. It is an axiom of information policy that it cannot artificially create a climate of opinion. It can only inform and reinforce a national mood which is itself the product of much wider and deeper political and social trends. Public confidence—especially in such a novel and non-traditional concept as a multinational Community—is easy to erode and much harder to recreate. Over the recent years of reluctant and lukewarm Europeanism in Britain our original large stock of goodwill amongst our partners has been steadily run down. They are not convinced of our desire to share in the leadership of Europe as we have done in the past, nor indeed of our will and capacity to reverse our deep-seated relative economic decline. And yet the goodwill of our partners and their readiness to make concessions is essential to solving the problem of Britain's inequitable budget contributions and restoring the belief of the British people in the Community.

Making a success of Britain in the Community ought to be a bi-partisan—indeed a tri-partisan—matter. It is a tantalizing thought that if Labour had won the 1970 election a Labour Government would have taken Britain into the Community with Conservative and Liberal support, and the anti-Europeans of both parties would have been an isolated minority. Many of the problems I am discussing now would never have arisen, and others like the Community budget would have been simpler to solve. As it is, the new Government will find that it requires long, patient, steady effort to turn round the present mood about Britain and the Community on both sides of the Channel.

There are many legitimate differences of opinion among Right, Left and Centre about the best internal policies for the Community to pursue. All who believe that Britain's future lies in membership of an effective Community hope that the new Conservative Government will from now on make the EEC the centrepiece of our foreign policy. Equally, they hope that the new Labour Opposition will not allow its largely self-inflicted humiliation in the European General Election to push Labour into being a completely anti-Community party committed to British withdrawal.

Official information

James Cornford

Director, The Outer Circle Policy Unit

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MY TITLE IS INTENDED to cover two related matters which have excited much public interest over the last few months—official secrets and freedom of information. The Official Secrets Acts and particularly the notorious section 2 of the Act of 1911 have of course been matters of public concern for many years. The Act of 1911 was passed through Parliament with scarcely any discussion during a spy scare, but as the Franks Committee has long since pointed out, its all-embracing character was not the product of inadvertent haste, but the culmination of twenty years of effort in Whitehall to get Parliament to take the problem of protecting official information seriously. The security of the realm was, and remains, the most effective argument for extending a blanket of secrecy over all official information, however trivial. The difficulty for those who want to remove part of the blanket has been to convince the doubtful sympathizer that the blanket is divisible, or that some of it can be turned back without revealing all. The alternative, very satisfactory to Whitehall, ministers and senior civil servants alike, is that the release of official information should be entirely at their discretion. It is of course necessary for government that a great deal of official information be published as a matter of routine. The problem with the discretionary system is that some information needed for effective parliamentary scrutiny and public debate is not made available until after its publication could have affected government decisions, or indeed, at all. And the government, in deciding whether or not to publish, is apt to confuse its own political position with the national interest.

In the debate on official secrets attention has been focused on section 2 of the Act of 1911 because of its broad and indiscriminate terms and its subsequent use with judicial blessing to extend secrecy to every conceivable form of information. It has even been pressed into service to prevent the corrupt use of official information in the absence of other adequate legislative provision. I will come back to section 2—its use, abuse and reform—as the main subject of this talk, but I should like to remark in passing that section 1 and other sections of the Official Secrets Acts are not satisfactory either, as the recent ABC case has demonstrated. The government faces a serious problem here: it is easy enough to call for a new Espionage Act, to limit the broad terms of section 1 to activities which are clearly a threat to the security of the nation; the problem for the government is the shift of concern from external espionage to internal problems of order, especially those posed by the Provisional IRA. The Russians know all about signals intelligence; the IRA doesn't. Public discussion of military and

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security matters is therefore a problem, and concern about 'who may learn what' can limit legitimate public discussion of policy in these fields, as it did in the Windscale Inquiry about some aspects of nuclear safety.

There is a difficulty for the government, therefore, in dealing with a new generation of investigative journalists, who are not enemy agents or sympathizers, but who refuse to play the insiders game—privileged briefings in return for discretion—and who do want to question publicly what is being done by the military, the security services and the police—matters which are hardly ventilated in Parliament and not regarded as legitimate game.

People interested in this line of enquiry stand to lose by any reform of official secrets legislation which leaves the present section 1 untouched and limits section 2 in the ways suggested by the Franks Report and the government White Paper. They see more effective sanctions operating in the fields in which they are interested. Section 2 would still bring criminal sanctions to bear on information concerning defence, security and law enforcement, and section 1 left as it is means that the mere receipt of information remains an offence.

On the other hand, no government can be satisfied with things as they stand. Section 2 has been an embarrassment since the *Sunday Telegraph* case over a leaked document concerning the war in Biafra. The jury could see no real threat to national security and threw out the case. The judge said it was time section 2 was pensioned off. The Franks Committee was appointed to examine section 2, found it wanting and recommended extensive reforms. Since then, police enquiries under the Acts have taken place into leaks of plans for railway closures and Cabinet decisions on child benefits; but no prosecutions followed. The latest prosecution in the ABC case, on matters which actually affected security, more or less collapsed.

It is, however, important to have effective protection of some information and it is exceedingly inconvenient if sensitive policy documents are leaked with impunity. A discredited law is discredited further by what appears to be a growing inclination in Whitehall to leak internal documents in the course of internal struggles over policy. The recent memorandum on heavy lorries comes to mind. Machines which have made copying easy, and difficult to detect, are having their effect on the style of government.

The simple answer to this quandary would be for the government to do what it has promised, namely, to reform section 2 in the direction of greater clarity and sureness. The difficulty is that the government cannot touch section 2 without running into the freedom-of-information lobby; it will have difficulty in carrying its own supporters for an official secrets reform that does not also fulfil its repeated pledges on 'open government'.

It is the government's view that the issues are separable. There should be a limited reform of official secrets legislation and a quite separate non-statutory policy for greater disclosure with more White Papers, Green Papers and Consultative Documents. This policy has already been enunciated in what has become known as the Croham directive, a letter from the then Sir Douglas Allen to his senior colleagues in Whitehall calling for greater release of information in order to forestall any substantial changes in constitutional or administrative practice.

There is also a freedom-of-information lobby which does not pay much attention to the problems of official secrets legislation, but is pressing for an equivalent to the USA Freedom of Information Act. This is pressure for a major constitutional change with little regard for the existing law, practice or constitutional conventions of this country. There appear to be three main motives behind this desire for freedom of information. The first is a concern about the relations between the individual citizen and the government. This concern covers both the protection of privacy—the control and correction of official data gathering which involves tricky questions of citizens' access to official files—and the abuse of officially acquired information about individuals, either through its communication to unauthorized persons, or its official use for purposes other than those for which it was first acquired. Another element here is the demand for much fuller information about administrative decisions affecting individuals, and particularly a demand that administrative rules and guidelines should be made public.

The second pressure for freedom of information arises from those concerned with controversial areas of public policy, where it is felt that established interests have a privileged relationship with government departments; the motorway programme and the development of civil nuclear power are examples. The demand here is from what are called 'single-issue pressure groups', which have considerable professional skills and knowledge but no obvious constituency and no insider status with departments. Their concern with particular policies is generalized into a demand for more adequate and open discussion, *i.e.*, more information and, therefore, more accountability (of the explanatory kind) in policy making. They are convinced that departmental and corporate interests do not necessarily add up to the national interest, and that we cannot understand policies or influence them if essential information is kept secret. In such fields as civil nuclear power, this leads to demands for information which is sensitive on both security and commercial grounds.

Finally, there is a more general motive for this policy: concern about the effects of the present discretionary regime on the freedom of the press, *i.e.*, the pernicious lobby system, the manipulation of the press by the control of access to information, and government by leak. The argument here is that the quality of decisions is adversely affected by the privacy of the governmental process and the co-optation of outside interests, including the press; these reinforce both the insularity of Whitehall and the feebleness of Parliament. Informed public debate and effective scrutiny by Parliament wait upon greater access to official information.

These various approaches have been expressed in a number of legislative proposals:

1. The government, as I have explained, already proposes a limited reform of section 2 and no further legislation.
2. *Justice* has proposed an administrative code of practice on the disclosure of information.
3. The All-Party Freedom of Information Campaign has produced a draft Bill which concentrates on a public right of access with the accent on individual privacy.

4. The Labour NEC has produced a Bill with the accent on access to information held by a wide range of public bodies.
5. There is before Parliament at the moment [March 1979] an Official Information Bill introduced by Mr Clement Freud which combines freedom of information with reform of official secrets. As I have had a hand in the drafting of this Bill, I think it may be useful to say something of the problems encountered and the solutions proposed.

The decision to combine freedom of information with official secrets was partly logical, partly tactical: logical, because any public right of access must conflict with section 2, which cannot be repealed implicitly without some replacement; tactical, because if the government were to succeed in reforming section 2 without any further commitment it would be a safe bet that a public right to official information would never follow.

In looking at section 2 the working party at the Outer Circle Policy Unit (hereinafter 'we') accepted the general line of the Franks Committee with certain modifications. We were also agreed that there should be separate legislation on espionage, to deal with the defects of section 1 and the remainder of the Official Secrets Acts, legislation on the use of official information for personal gain as part of any legislation on corruption and separate legislation on privacy and the question of access by citizens to files kept about them by public authorities.

But our most important conclusion was that there must be a public statutory right of access to official documents subject to specific exemptions. The government must be obliged to justify refusing information. The reason for this was that we did not believe that a system which continued to be based on discretion would result in any fundamental change; rather, political advantage and administrative convenience would prevail. In politics information is one currency of power and there is no reason to think it will be easily surrendered.

But how would a public right of access work? Experience abroad, especially in Sweden and the USA, offers encouragement and a rough guide to some of the thornier problems, but no more. Differences of constitutional and administrative practice, and historical experience, make imitation difficult. We had to adapt general principles to the existing law and institutions of the UK: to the Official Secrets Acts themselves, the Public Records Act, the Parliamentary Commissioner, Parliament itself and the courts.

The basic problem of a public right of access to official information is this: What are the exceptions going to be? And are they to be general or specific? Should one follow the Swedish model and have a long list of the types of documents exempted from disclosure, or the American example of general principles which government agencies may invoke when refusing information? We settled for the American model because this allows for argument about the public interest in disclosure and avoids the difficulty of achieving completeness in a list of specific documents. The exemptions we propose are more or less standard: documents need not be made available if they affect:

—defence or security;
—relations with foreign governments;

—law enforcement;
—the privacy of individuals;
—commercial confidences;
—Cabinet proceedings for a period of five years.

The last exemption is an inadequate concession to the undoubted need for confidentiality in decision-making—and there have been strong arguments in committee to exempt Cabinet proceedings altogether or to lengthen the period of exemption.

These exemptions, together with the clauses of the Bill dealing with the protection of information, create three classes of official information:

—that which is exempt from disclosure and which is also protected by criminal sanctions, *e.g.*, security, privacy;
—that which is exempt from access but not protected by criminal sanctions, *e.g.*, Cabinet proceedings on domestic policy;
—that to which there is a public right of access.

There is considerable pressure to squeeze the second category out and to equate information exempt from disclosure with information protected by the criminal law. But that would repeat the mistakes of section 2 and render indiscretions a crime when they can be dealt with satisfactorily by civil service discipline.

A public right of access also involves defining information, providing the means to identify it, establishing the method of asking for it and an independent adjudicator in cases of refusal. All of these raise difficult problems which we have attempted to answer in ways which I can only briefly describe: first, by limiting 'information' to existing documents (though 'documents' is broadly defined); secondly, by requiring departments to maintain guides and catalogues to their archives; thirdly, by requiring applicants to specify in writing what they want to see and departments to furnish reasons for refusals to grant access within a specified time; fourthly, by providing that the Advisory Council on Public Records should vet departmental arrangements; and lastly, by providing for appeal to the Parliamentary Commissioner against refusals of access and an ultimate appeal to the courts.

There are, of course, many other important points of detail—the treatment of computer-based records, the obligation of departments to publish administrative codes, protection for civil servants against actions for defamation, and so on—which I cannot now pursue. I can only say that we have made serious, if not always successful, attempts to deal with them.

There remain two questions which will, I think, be of particular interest to this audience, especially those of you who are government librarians. The first is the implications for record keeping and archives and the second is cost. There is no doubt that the system proposed in the Bill would require a fundamental change in the way papers are prepared and filed and that this would present an enormous job for archivists and librarians. That is the first element of cost and the only 'guesstimate' I have heard was from the Minister of State for the Civil Service who mentioned a figure of £25 million to bring existing records into line; it is probably too low by half. How much the system would cost on a continuing basis it is simply impossible to say: we can get rough estimates of the cost of individual enquiries but can have no idea of what the volume of these enquiries might be. Much of the cost of introduction could be avoided if the legislation were not retrospective; this would also avoid the difficulty of disclosing documents written on the assumption of confidentiality and thus exposing civil servants and others to unfair criticism. No document, however, is secret forever, and I myself hold to the opinion that it would be salutary for politicians, civil servants and the public alike if such documents were more readily and more quickly available. As to costs, it is unlikely that we shall have accurate figures even after such a system has been established. In the USA, departments and agencies have consistently exaggerated the costs of the Freedom of Information and Privacy Acts: grossly, before they were enacted, and substantially, afterwards, by padding the account with items for which they would have paid anyway. It wouldn't surprise me at all to find Whitehall departments attributing the £24 million presently spent on information programmes to an Official Information Act if they had to accept one. This would inflate by four or five times the most reasonable estimate for the running costs one can derive from overseas experience. That unworthy suspicion apart, I accept that any system would involve substantial costs and a lot of hard work; the question is whether the greater openness of government to which so many pay lip service can be achieved in ways which are less radical, expensive and uncomfortable. I doubt it.

Envoi

Since this talk was given, in March 1979, things have moved on, or back, a bit. The former government published a Green Paper which rejected a statutory right of access, made a strong case against retrospection on administrative and cost grounds and favoured with all due caution an administrative code of practice. The Official Information Bill, having more or less survived its Committee stage, was another victim of the May general election. The new government has announced its intention to legislate on official secrets but has said nothing about freedom of information. Sighs of relief in many quarters no doubt; but we shall be back.

The librarian/information officer as a consumer

Trevor Haywood

Senior Lecturer, Department of Librarianship,
City of Birmingham Polytechnic

Paper presented at the Joint Annual Conference of the Aslib Midlands and Northern Branches, Malvern, 10th–12th May 1979

At this conference, librarians and information officers tried to discover whether they could be more efficient and effective through acquiring a better understanding of their relationship with those who supply them with products and services. The conference was structured into sessions which looked at particular relationships, e.g., *with the publisher, retailer, data base provider, information service. Representatives of technical and commercial services gave brief presentations and fielded questions in discussion groups. Trevor Haywood, the theme speaker, visited each group, and as part of his final presentation, published here, brought together general conclusions emerging from the groups.*

THIS IS THE FIRST TIME that I have been invited to speak to a group of librarians and library suppliers with the Malverns at my back and a request from the Chairman to be controversial. I will use the headings which I submitted for the conference agenda some weeks ago, even though I now think that one or two of them are not particularly pertinent to the way that the conference themes have developed during this weekend.

What sort of consumers are we?

I would say that we librarians are traditionally conservative in our consumer habits, often timid, generally oversympathetic to the problems of our suppliers, creatures of habit and highly individualistic in our approaches to mechanizing our purchases of library materials.

Collectively, of course, we should have a lot of economic clout working for us in the sort of demands that we might make on suppliers of library materials; but the difficulties that *we think* that we face in organizing ourselves into effective user and consumer groups have hindered our ability to become 'professional buyers' in the really discriminating sense.

One of our problems is that we often haven't got the time to monitor the effectiveness of a complex information source, in order to formulate detailed criticisms or demands for revision and change. The economic 'squeezing' of libraries (which public sector libraries will be feeling even more now after the general election results), is a major element in librarians' not being able to spare the staff time to 'step aside' from the day-to-day dynamics of their operation to check up on the benefits that users are really deriving from particular products and services.

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In the rapidly changing technological configuration of the information industry, we often find ourselves non-numerate, non-technical, and over reliant on emotional, rather than scientific, yardsticks in our evaluation of the great range of modern products and services confronting us—absolute push-overs, I would have thought, for the well-rehearsed and sophisticated presentation of a packaged data base.

In many ways, I think, librarians remain genteel followers in the footsteps of purchasing approaches that were started by 'the first librarian'. They carry on what was started, until 'carrying on' becomes more important and, of course, much easier than stopping and reassessing user behaviour and user needs in relation to what the market place has to offer.

Librarians want 'relevance'; relevance at a point in time is their great quest. But what is relevant changes, sometimes too quickly for librarians, and certainly too quickly for many publishers, especially if they produce hard copy material, for they will want some stability and continuity for their product in order to develop workable profit margins. Lynda Arnold (Predicasts) made the plea: 'I urge you to be realistic in your demands.' But librarians' demands reflect the 'realism' of their users, and many library users will be anything but 'realistic' in her terms. Therefore, our search for 'relevance' will always be something of a compromise.

Library users articulate their needs, and librarians attempt to meet these needs from what is available, and what is available at any one time is a complex mix of:

(a) market economics, in a small market susceptible to near-monopolies due to the sometimes awesome retrospective investment that would be required to compete with another product which may be 'adequate' rather than 'complete';
(b) the rate of technological change, including the rate at which data, and forms of data, become dated;
(c) the level of resources that publishers can afford to deploy in the innovative expressions of new needs, *i.e.*, the difficult balance of changing your product and keeping your sales in the process.

On the whole then, and in the face of these difficult problems, I think that the librarian/information officer is a kindly, understanding consumer—perhaps too understanding to demand radical changes in products and services, and too conservative to initiate a more aggressive consumer style. It has been interesting to note the number of suppliers who have praised the great value of libraries as natural and valuable advertisers of their services, to wit, the remark by George Henderson (CBD Research): 'One copy of *Councils, Committees and Boards* on the shelf of a public library helps to sell twenty copies outside.' Perhaps we should demand that our discounts reflect something of this 'value'.

How does our education and training equip us to deal with the wide range of suppliers in the information industry?

In a word, it doesn't. I believe that our formal library-school syllabuses need some radical revision in the area of 'relationships with suppliers' and 'consumer options within the information industry'.

Certainly the 'principles' of selection, ordering, acquisition and supply of library materials are dealt with in library schools but, unfortunately, they are often not very well co-ordinated with different aspects of librarianship, *e.g.*, 'bibliography' and 'management', and are generally confined to the traditional problems posed by books, journals and the more popular non-book materials. I suspect that there is no real appreciation taught of the changing face of the market place, nor is there anything but a cursory attempt to develop a dynamic 'consumer' approach to the market place.

In one group session yesterday I advocated the development of a 'Products and services' module in library-school syllabuses, a part of which could be given over to the involvement of a wide range of library suppliers who could expose students (and library-school staff) to different marketing approaches, different forms of data presentation, different access points and the different economic considerations that motivate, or de-motivate, certain types of supplier.

This would mean that the harsh voice of commerce would be heard in the tranquil corridors of library schools and, moreover, given a legitimate hearing as part of a formal course. I know that ISI already does some work in this respect, and lectures and talks by visiting publishers and library suppliers are not unknown in library schools, but these are more in the way of cosmetic incursions rather than carefully planned involvement. I advocate the adoption of the following sorts of involvement to help develop consumer awareness by library-school students:

1. publisher and supplier presentations and exhibitions as part of formal courses;
2. more publisher/supplier information automatically being sent to library schools in order that displays of current products be maintained on a regular basis;
3. the involvement of practising librarians with experience in choosing suppliers and dealing with day-to-day options in the market place.

It could be argued that formal training at library school can only ever rise to the status, with regard to consumer education, of an informed 'interlude', a simulated experience which simply helps prepare students for the important on-the-job learning which will equip them to deal with the real changes in the detailed configuration of the information industry; and indeed, that library school learning in this particular area might be rather dangerous, and that only in-house experience with the market place is really credible.

I must say that I am impressed by the number of ex-librarians here today who have moved over into publishing or library supply—George Henderson (CBD Research), Peter Catherall (ISI) and Sylvia Martin, straight from library school (Hudson's Bookshops)—all celebrating their previous vocation as a great help in 'knowing the market'. Nigel Oxbrow (Alan Armstrong & Associates) also alluded to the need to recruit librarians for his new and magical 'specialist supplier' to deal effectively with the problems of special library supply.

The problem of identifying what is on offer

In many ways the librarian/information officer is spoilt for choice. The ten suppliers attending this conference have provided us (by quite aggressive presentations of their products and problems) with mountains of printed publicity. If 'information' itself is a complex and sometimes overwhelming concept, it would seem that the various agencies competing to market parts of it testify to this complexity by the bulk of their explanatory and advertising material.

None the less, the signals available to inform librarians of what exactly is on offer sometimes seem quite fortuitous and haphazard: direct mail shots into the unknown; a friendly representative spending upwards of an hour in pleasant conversation with the wrong person; some half-hearted exhibitions at conferences. . . . The library supply market is fast becoming a market place of melancholic cut-backs, freezes and tighter and tighter budgetary constraints, not an arena for a loose or sloppy approach to marketing techniques. The 'hits' need to be more accurate, more subtle and, of course, more relevant.

The problem of comparison and evaluation of different information approaches

The vast array of approaches, formats, coverages, changes, currency and potential overlap among similar systems presents the practising librarian, at the sharp end of his organization's purchasing operation, with a veritable maze of choices. Help is needed here; Aslib's *On-Line Bibliographic Data Bases 1979 Directory*, and the British Library/Department of Industry On-Line Information Centre (located at Aslib), are a start; but some sort of comprehensive and evaluative *Which Information Service?* is needed, perhaps sponsored by Aslib, the Library Association and the British Library, to help busy librarians make more sense of the choices that are available. This sort of help is needed; mistakes made in some of these high-investment areas of information dissemination can be disastrous for the small industrial library or information unit.

One question in this area that bothers me, after having heard the supplier presentations over this weekend, is: Just how honest can data base providers afford to be when presenting their wares to librarians? So much is unknown at the early stages of such a relationship, about potential 'hit' rates and incidence of use, and I wonder just how many providers of complex information services actually recommend to a librarian who has approached them, or whom they have approached, that s/he would be better off *not* subscribing to their service.

Economic censorship and traditional budgetary requirements of libraries

This will no doubt continue to be an important determining factor in librarians' responses to new supplier approaches, to new products, and to new forms of information supply. I think Lynda Arnold was being a little naive when she said that, if librarians are threatened with cut-backs, 'they can surely impress on their chief executives or library boards the vital need for this particular service'. Libraries in the public sector and, indeed, many private, company libraries are increasingly dominated by cash-limits and account books, and the scope for such pleas and heart-rending must, in practice, be very narrow. A sit-in by research workers? A lie-down by librarians? Such theatre rarely inhabits the world of the special librarian.

Documents and data plus: what additional services can librarians get from their suppliers?

Nigel Oxbrow says that we get what we are prepared to pay for in the way of extra services. But some librarians, particularly public librarians, are accustomed to getting a bit more than they pay for.

According to a recent letter in *The Bookseller* some library suppliers are subsidizing services to libraries at as much as 12½–15 per cent of the real price of such extra services, and of course librarians love it. Thus, while the needs of special librarians are said to require special on-costs, public librarians are taking advantage of the cut-throat library supply activity in their area, and getting used to a whole range of 'document-plus' services at less than real cost.

Are the needs of special librarians really so very different? It may be presumptious of me to think so, but I don't think that they are. Are they really prepared to pay extra for, say, a rush service? I thought that all librarians wanted a rush service as part of any normal librarian/supplier relationship. Are they really willing to pay extra for a bit of bibliographical checking to ensure accurate despatch? I would have thought that contracting purchasing power in all types of library will mean that they will want more, not less, in the way of document support services, and that suppliers will have to re-think their profit margins, and their operating styles, in the light of monetary policies which are ostensibly designed to improve private options and enterprise.

Can there really be any understanding between librarians as consumers and their suppliers, and should there be?

Obviously, this weekend gathering suggests that librarians and information officers are willing to try understanding their suppliers, and that suppliers want to know what is worrying us. Other agencies are also at work. I understand that the Library Association Industrial Group is hoping to provide a forum, via specialist committees, to air changes that are made by both librarians and suppliers; the Aslib Information Industry Group may also develop as an effective consumer lobby; and various consumer groups may eventually rise to the challenge of common problems.

I remain pessimistic. Can librarians organize themselves to influence the political climate, inside and outside their organizations, which will cut their budgets and neutralize their real choices?

Can libraries which have the necessary resources make the transition to accommodate new forms and packages without exposing innovative suppliers to deadly financial strain in the early stages of new product development (note ISI's On-Line Service's dependence on the viability of hard copy sales)?

What chances have librarians got of changing the basic concept of a product or service that is financed and promoted from the other side of the Atlantic?

Can any user influence really be brought to bear on George Hulme's (Technical Indexes) worldwide Dutch/American/German interests, to perhaps accommodate themselves to some seemingly small domestic requirement?

I have heard George Henderson's policy on updating his services and the reasons behind some lack of currency (economic of course); but do these explanations help me?

I listened with interest to Alan Fish's (Kompass) problems, his criteria for inclusion, his problems with what the law will allow so far as data on 'unwilling' companies is concerned; and also to George Henderson's problem of complex companies' willingness to pay for exhaustive inclusion in his directories. I took note of Lynda Arnold's urging to 'remember the trouble involved in asking for extra services', and also Andrew Ede's (Anbar Publications) plea that his profit margins couldn't withstand too many user requests, if he ever had any.

I have heard all these things, but if I was a librarian/information officer, here today, I would feel as impotent to influence them, to really influence them, as if I had never heard them. I can understand, but I cannot act.

In the end, of course, the value of information products is the value that library users set on them. They are not valued, or shouldn't be, in terms of simply having information knocking about in a variety of forms, but rather in the *gain* or *benefit* achieved by putting the information to *use*. The librarian as a consumer acts on behalf of users who hope to reap benefits, and the connections between anticipated user demand and market availability are often delicate and subtle.

This is all the more reason, I suggest, for librarians and information officers to take care not to comprehend too well the problems of data publishing and supply, lest the tail wags the dog to death, lest the pervasive power of the information industry, helped along by our bottomless understanding, not only applies itself to satisfying our needs as consumers, but actually begins to *create* the needs which need satisfying.

Information retrieval: the published catalogue or the personalized information service?

Veronica F. Barker

Senior Information Officer, Centre for Medical Education, University of Dundee

WHEN SEEKING INFORMATION enquirers want accurate and up-to-date information. They also want to expend the minimum of time, mental energy and money on obtaining information. But often enquirers are inexperienced in the systematic searching of indexes and may need help in clarifying their needs, and in translating expressions of need into the language of the information retrieval system they are trying to use.

In view of these observations, how does information retrieval via the published catalogue compare with use of a personalized information retrieval service? The question has been considered in the context of the need of medical and dental teachers for details of audiovisual programmes in their speciality.

A Medical AudioVisual aids Information Service (MAVIS) has been available since November, 1976. It has been funded in its three-year pilot stage by the Wellcome Foundation Ltd. and Update Publications Ltd. The service is provided by the Senior Information Officer, Centre for Medical Education, University of Dundee, Scotland with the part-time assistance of one information assistant and the full-time assistance of one secretary.

The aim of MAVIS is to provide an information retrieval service on medical and dental audiovisual material available in the UK, to include films, filmstrips, videotape, tape/slide, models and simulators. The service is intended to be of value to teachers of undergraduate and postgraduate students in medical, paramedical, dental and paradental sciences, individuals wishing to further their own education, and producers of audiovisual materials.

Its main uses are to identify audiovisual material for teaching purposes or personal continuing education; to help avoid duplication in the production of audiovisual materials; and to identify topics not adequately covered by audiovisual materials.

The service is based on an information bank consisting of details concerning over 10,000 programmes, classified by subject, subdivided by medium and stored on 8-inch × 5-inch cards. There is an alphabetical subject index of over 6,500 entries stored on 5-inch × 3-inch cards. The subject classification schedules are an adaptation of the US National Library of Medicine classification scheme. There is a reference bank of 850 suppliers' catalogues arranged alphabetically,

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and a suppliers' address list recorded on 5-inch × 3-inch cards. Hiring/purchasing regulations are also stored alphabetically in commercially available expanding files. Finally, review data are available, in classified order, index-linked to the programme details in the main sequence of the information bank.

The information bank is based on published catalogues and other lists. Catalogues are sought and received. One copy of each is kept intact for reference purposes and the other scanned for relevant entries which are cut out and stapled on to 8-inch × 5-inch cards. Photocopying of pages is only necessary where required data are back-to-back on a catalogue page. Where descriptions are extensive a pouch is made of two cards stapled together and the information placed in the pouch which bears outline details.

Each card or pouch has written on to it the format, for example, 16-mm film, tape/slide, the name of the supplier and the subject classification number. The cards are filed in classified order with liberal use of guide cards both for the class mark and the media subdivisions within each subject category. The cards have proved sturdy against repeated handling.

An enquirer can request information by completing a standard application form, writing a letter, telephoning or visiting the Centre for Medical Education, University of Dundee.

On receipt of a MAVIS request a manual search is undertaken by a qualified information scientist and a secretary photocopies the selected information-bank record cards for the enquirer to retain. The full address of each programme supplier is provided plus any known hire or purchase instructions. The package of tailor-made information is despatched together with two evaluation forms. An average of sixty enquiries are received per month and replies are forwarded within a few days, over 50 per cent being completed within five days of receipt of the enquiry.

The methods employed are simple in the extreme and most effective. Capital outlay is minimal: the only equipment required is a typewriter, a photocopier (both of which are usually already available in any office), plus minor items like scissors, stapler, etc. The furniture required consists of 8-inch × 5-inch drawers, 5-inch × 3-inch drawers, shelf space, a few low tables plus the usual desks and chairs.

Runnings costs are low, as the need for staff is modest and for equipment maintenance minimal. Staff require only simple training based on a procedure chart, and time spent on entering and retrieving information is small. Against these 'plus' features are three features which may be classified as 'minus': some support tasks are undoubtedly boring, the information is not presented in a standard format and its appearance is of working papers rather than professionally designed packages.

To use the MAVIS service requires little effort, and the response is demonstrably swift, accurate and up to date. No information handling expertise is required on the part of enquirers and they can discuss their needs, particularly if these are only partially formulated, with an experienced member of staff.

All the criteria listed at the head of this article are, therefore, met: the minimum of time, mental energy and money are spent on obtaining information.

What then of the published catalogue approach to information retrieval? The information bank is a prerequisite to the publishing of a catalogue, but to this information bank is added much increased cost, increased staffing, enormous delay, major loss of up-to-dateness, mass-produced bulk information rather than a tailor-made response, a demand for some measure of information handling expertise on the part of the enquirer, access to additional highly expensive and temperamental machinery and the inculcation of special skills on the part of supporting staff.

The inappropriateness of buying bulk information is underlined by the fact that over half the MAVIS searches are answered by less than ten cards, and over three-quarters of the search replies involve less than thirty cards. This is from an information bank of some 10,000 cards.

On the inappropriateness of bulk information, Whitehead[1] states: 'Most consumers of small amounts of information (and most consumers of information are really in that group) do not have specific information budgets. Therefore, if they have to pay large amounts of money to start to use the system in any way, they will be excluded from it.' In this context the price of a catalogue can well be a barrier.

If a catalogue were published to replace the tailored MAVIS information service, users would be asked to pay for 10,000 items of information when most people demonstrably seek less than thirty items. This seems bad economics. The purchase price for one well-known medical film catalogue is £2.50 for approximately 875 entries, another (now significantly defunct) had a purchase price of £3.50 for 1,000 entries; another current catalogue carries the price of £10.50 for approximately 3,000 entries. *Pro rata* the purchase price of a MAVIS catalogue of over 10,000 items would be approximately £35. This would surely be a barrier to most potential users of this service.

Catalogues of any size take many months to produce and require specialist staff. The published catalogue has in-built obsolescence and significantly lacks currency. Supplements make searching cumbersome and only partially obviate the lack of currency of the information. Much more detailed indexing and cross-referencing is necessary in a published catalogue than in a specialist information-scientist mediated search. Overall a published catalogue requires time, effort and money to exploit. Microfiche publication may appear to reduce the cost to the enquirer, but microfiche readers are far from ubiquitous and they can cost £100 or far more. Few people are likely to choose to search a microfiche rather than lift the telephone or write a letter to an information service.

What about on-line? Kent,[2] Director of UKCIS, states: 'Taken by and large, on-line search systems as they are currently available are, both absolutely and in cost terms, less effective than any other existing means of information retrieval.'

The simple approach to information wins on every count. The tailor-made information service is most effective and can be recommended from experience.

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Letter to the editor

BRADFORD'S LAW

The paper by Drott *et al.* on Bradford's Law (*Aslib Proceedings*, June 1979) is very interesting. Without at all wishing to belittle the legitimate interests of research workers, the more general principle is, I would submit, more important than the search for a specific law:

The 'law' first appeared as a statement by a nineteenth-century Italian economist, Vilfredo Pareto, who noticed that a very large proportion of the wealth was controlled by a very small proportion of the people. He formulated the general proposition that 'in any series of elements to be controlled, a selected small fraction in terms of numbers of elements almost always accounts for a large fraction in terms of effect'. His 'Pareto Principle' later re-appeared as the '80-20 Rule', which states that approximately 20 per cent of the items in a collection account for approximately 80 per cent of its value. This rule is currently used as a management tool in stock control, whereby the major effort is concentrated on controlling the small (and, therefore, manageable) number of more expensive (and, therefore, more important) items. The more general statement of the same principle is 'the vital few and the trivial many'. Surely *this* is the important point, because it leads us straight on to the question of priorities. All too often we waste time and money on 'the trivial many' instead of concentrating our attention and our resources on 'the vital few'.

The secret of success, then—in life as in work—is to identify 'the vital few'. But how to do *that* is another story!

JOHN RUSSELL,
Reading, Berks.

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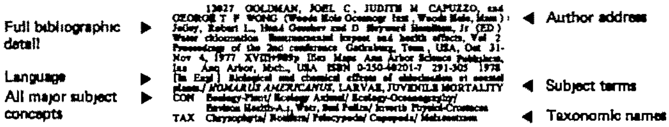
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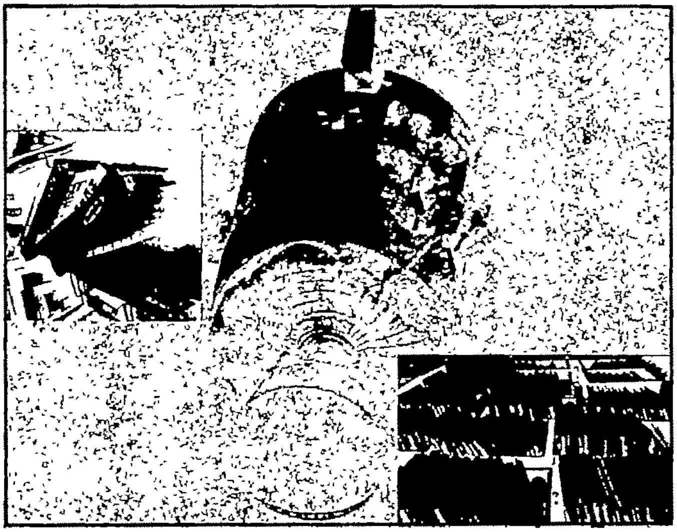

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OCTOBER 1979
VOL. 31, NO. 10

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Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, Kathleen Gray, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

Editorial

DURING THE LAST FEW YEARS Editors have discouraged the writing of papers on 'how I run my library good'. Unfortunately this has resulted in a dearth of literature on what goes on in special libraries, in spite of recent changes affecting operations, e.g. availability of external services, increased mechanization and economic constraints.

Special librarians *are* interested in what other libraries are doing and how they can improve their own services.

Several special librarians were invited to write papers for a series on Library Information Management. However, the editor would welcome articles (3,000–4,000 words) from other librarians who feel they can contribute.

A check list has been prepared to indicate the range of information required:

1. *Organization and Management*:
    - (a) Main objectives of library and information service.
    - (b) Main parameters of parent organization; position of library in parent organization; reporting chair.
    - (c) Internal organization and physical arrangement.
    - (d) Staff organization.
    - (e) Financial management.
    - (f) Performance monitoring: Planning.
2. *Services provided to users*:
    - (a) Type of service—reference, lending, retrieval, dissemination, other.
    - (b) Techniques—manual, mechanized.
    - (c) Use of external services.
    - (d) User characteristics.
3. *Special functions of Librarian or Information Manager*:
    Responsibility for publication: report editing; printing and photographic units; translation unit; patents; etc.
4. *Library publications*

Further information is available from Kathleen Gray, Editor, Aslib, 3 Belgrave Square, London SW1X 8PL.

A technical information service on coal

Maxine MacCafferty

Technical Information Service, IEA Coal Research

Paper prepared for the series on Library Information Management. This paper is followed by another, which deals specifically with the IEA Coal Data Base (Davidson, R. *M. The IEA Coal Data Base.* Aslib Proceedings; 31 (10), *October 1979, p.* 452–459).

International Energy Agency

THE IEA[1,2] is an autonomous body established in November 1974 within the framework of the Organisation for Economic Cooperation and Development. Twenty of the twenty-four member countries of the OECD participate in the IEA, and the Commission of the European Communities takes part by special arrangement.

IEA Coal Research

The United Kingdom was invited to take the lead in establishing the Working Group on Coal Technology. The Department of Energy requested the National Coal Board to act on behalf of the UK, and Mr Leslie Grainger, then NCB Member for Science, became the Working Group's Chairman. NCB (IEA Services) Ltd was formed, with the NCB as Operating Agent, and it is funded entirely by IEA-participating countries.

Current projects[3,4,5] are the Technical Information Service, Economic Assessment Service, World Coal Resources and Reserves Data Bank Service, Mining Technology Clearing House, and Fluidized Bed Combustion. Future projects approaching agreement include pyrolysis, treatment of gas liquors, review of basic coal science, and continuous feeding of solids into pressurized reactors.

Apart from the Clearing House which is based in Staffordshire so as to be close to the resources of the NCB's Mining Research and Development Establishment, all Services are based in central London. However, the Fluidized Bed Combustion experimental plant is situated at Grimethorpe. Access to any of the services is permitted only by organizations in those member countries which have signed the Implementing Agreement for that Service.

Technical Information Service

The TIS aims to report on developments in coal technology worldwide, to facilitate information exchange between participating countries, and to supply a single source of reference for the subject area. It is not intended to replace existing national information services, but to supplement them. Sources used will be confined to published information and information which member countries agree can be published.

Aslib Proceedings, 31 (10), October 1979, p. 445–451. Printed in Great Britain

The Service is supported by both coal-producing and coal-consuming countries, currently:

Austria
Belgium
Canada
Denmark
Federal Republic of Germany
Ireland
Italy
Japan
Netherlands
New Zealand
Spain
Sweden
UK
USA

Staff recruitment

Some difficulty was experienced in recruitment. Secondments were sought from member countries, but as none could be found by the end of the first year of the company's operation, advertisements were placed. Consequently, except for the Head of TIS who commenced in August 1976, there was no staff until the following Christmas. The recruitment market for information scientists was sluggish, as usual, and many applications came from over-qualified or wrongly qualified people. Another problem affecting recruitment was the offer of positions on fixed two-year contracts in the first instance. A few potential expert applicants were probably lost: older people required greater security of tenure. We now have ten professional staff and five clerical staff.

Coal Abstracts

The first task of TIS was to establish a computerized database with these capabilities: on-line searching, vocabulary control, printed keyword indexes, and typesetting of a monthly abstracts publication. Our remit was to have immediate availability with a minimum run-in period, reliability with guaranteed program maintenance, ease of use, and technical support so as to eliminate in-house programming. The ASSASSIN[6] software package from ICI was chosen, with ICI acting as computer bureau, and Kynoch Press taking on the computer typesetting and printing. At present, ASSASSIN is only capable of batch (off-line) searching, with a weekly turnaround time, but an interactive search program is under development.

Two of our major input countries use the Energy Information Data Base subject thesaurus,[7] of the US Department of Energy, for indexing. Therefore, it was sensible to conform to an existing and established system, rather than compile a totally new system. The first edition of our Coal Thesaurus is now published, and is an extension of the US Department of Energy Thesaurus. At present it is only in English. Vocabulary control is considered essential, as we cannot expect our internationally distributed users to cope with free English language indexing. The vocabulary is highly structured and rich in lead-in terms, but ASSASSIN does not itself permit a highly detailed display. The thesaurus conforms to ISO 2788,[8] and will be updated annually.

The database commences from 1976, but we are now implementing a retrospective input of selected material back to 1973. Input is received from the following providers:

Belgium: Institut National des Industries Extractives
Canada: Centre for Mineral and Energy Technology
France: Centre d'Études et Recherches des Charbonnages
Italy: Ente Nazionale Idrocarburi
Japan: Ministry of International Trade and Industry
Netherlands: Dutch State Mines
New Zealand: Ministry of Energy Mines Division
Sweden: Studsvik Energiteknik AB
UK: National Coal Board
USA: Department of Energy
West Germany: Kernforschungszentrum
Franklin Institute, Münich

Although IEA Headquarters are in Paris, France is not a member, so we subscribe to CERCHAR. The Franklin Institute is contracted to cover East European literature. Output is processed on word-processors in-house.

Coal Abstracts commenced publication in 1977 with only three issues. With a full programme from 1978, the monthly abstracts are allocated to one of twelve subject categories, with cross-referencing:

- *Coal Industry*
  - Energy policy
  - Marketing and economics
  - Regulations
  - Research and development programmes
- *Reserves and exploration*
  - Exploration
  - Coal reserves and deposits
  - Geology
- *Mining*
  - Surface mining
  - Underground mining
  - Strata and ground control
  - Haulage and hoisting
  - Mine environment
  - Mine equipment
- *Preparation*
- *Transport and handling*
- *Properties*
  - Physical and mechanical properties
  - Chemical properties and analysis
  - Petrology
- *Processing*
  - Carbonization
  - Desulphurization and purification
  - Hydrogenation
  - Gasification
  - Liquefaction
  - Pyrolysis and cracking
  - Solvent extraction
- *Combustion*
  - Power generation
- *Waste management*
- *Environmental aspects*
- *Products*
  - Coke
  - By-products
- *Health and safety*
  - Accidents and rescue
  - Health hazards

Each issue also contains a continuously updated *Coal Calendar*, listing all types of meetings, exhibitions and courses which might be of interest to any sector of the coal industry.

Documentation control

TIS does not have a library, but a few housekeeping routines have to be maintained, and these are managed on behalf of all IEA Coal Research. Non-serial publications acquisitions are mainly devoted to essential reference works.

Nearly 300 periodicals are taken, about one-third circulated to us from the various NCB libraries, about one-third on subscription, and the rest received *gratis* under various exchange agreements. The collection is mainly concerned with coal and mining, and various secondary services, but we also cover energy and environment, general technically-oriented science, and miscellaneous topics including information science, computer science and micrographics. TIS administers circulation but stores only the most recent three months.

Interlibrary lending is an important service to staff. The bulk is dealt with through the British Library Lending Division, of course, but many organizations, not least the NCB, are most ready to assist, both within the UK and overseas.

An ephemera file was instituted for unsigned articles, editorials, press notices, book reviews, and similar material which would not appear on our database. The same twelve subject categories were used as in *Coal Abstracts*, with a greater breakdown for sensible indexing. However, the collection was terminated after eighteen months, as there was no use made of it. Most of it was converted to microfiches for archival storage.

TIS has established a small in-house micrographics facility. All documents on our database which are difficult to obtain, such as many reports and unpublished conference papers, are put onto microfiches, plus all IEA documentation for company archives. Our system uses 16 mm roll film, which is then jacketed to form 60-frame microfiches. The following equipment was selected, and has proved more than satisfactory:

16 mm planetary camera: Bell & Howell Filemaster;
jacket filler: 3M;
diazo cut fiche duplicator: A-M Bruning OP-10;
readers: five NMI-75 portables, one Fuji RFP2 portable;
reader/printer: Kodak 321/323;
fire-safe;
larder-type auto-defrost refrigerator.

When guarantees for the equipment expired, it was found convenient both practically and financially, to contract one firm to maintain and service the entire installation, rather than have all the individual manufacturers attending just to their own equipment.

Documents which are put onto microfiches are assigned a special number by which a diazo copy can be ordered. Permission to convert documents to microfiches is given by the publisher via his country's representative to TIS.

Commercially available databases

Externally available computerized bibliographic databases are used for retrospective searching and fringe area coverage. We use the four major services accessible in the UK: ESA-RECON, Lockheed-DIALOG, SDC-ORBIT and BLAISE-ELHILL. Euronet-Diane, of course, is on the horizon. Our equipment consists of a 30 cps Texas Instruments Silent 700 teletype-compatible thermal printer and a Newbury Laboratories visual display unit. Unfortunately, these two are not entirely compatible. They cannot run together, and control keys have to be used to go from one machine to the other.

Publications

A series of executive summaries, technical reviews and bibliographies are being produced. As with *Coal Abstracts* and the *Coal Thesaurus*, these are distributed free to member country representatives, but are also available for purchase. Our publications are listed in a bibliography at the end of this article.

Enquiries

As implied earlier, organizations are expected to use their own country's resources, and fall back on us only in the event of disappointment. Companies having little or no library service are often unaware of the resources available to them, and this information is passed on to them.[9,10,11,12,13] Document delivery is often a serious problem, but we consider it absolutely essential to assist enquirers who have experienced difficulties. At present, no charges are made for answering enquiries, running SDI profiles or sending off microfiches. But, these might have to be instituted, if our workload should dramatically increase.

Research register

A new project just starting is the preparation of a World Directory of R & D on Coal Technology. A test has commenced to compile a register of UK research, containing the minimum information essential to avoid duplication of research. With very little effort, the project has already proved to be very large, even without considering updating problems. Certain of our member countries have spent years of work and vast sums of money in trying to produce up-to-date registers of research, and the task is daunting. Another proposal for action by TIS is the publication of a coal information sources book or file, to include all the available resources in both IEA and non-IEA countries.

Liaison with other IEA projects

Two other IEA projects have some overlap with TIS: biomass conversion (the possible overlap is peat) and combustion; both have their own technical information services.

IEA Biomass Conversion Technical Information Service is a collaborative programme between a group of countries which at present include the UK, USA, Ireland, Sweden, Belgium, Austria, Switzerland and New Zealand. It is operated by the National Board for Science and Technology of Ireland and the Institute for Industrial Research and Standards, and covers information on production, harvesting, processing, transportation and conversion techniques. A bimonthly current awareness bulletin is produced along with occasional literature reviews.

IEA Combustion Research is a collaborative programme between the UK, USA, Sweden and Italy. The UK work is supported by the Department of Energy and co-ordinated with the Heat Transfer and Fluid Flow Service at the AERE, Harwell. They publish a quarterly *Combustion Research Digest*, not abstracted but highly indexed.

Summary

IEA Coal Research is now in its fourth year. TIS has a well-established database with *Coal Abstracts* and the *Coal Calendar* successful offshoots, and a flourishing publications programme. The microfiche service is expanding and has been proved very useful. The groundwork for the Technical Information Service having been laid, the future promises to be a very busy time.

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The IEA Coal Data Base—the development of the Coal Thesaurus and indexing strategy

Robert M. Davidson

Technical Information Service, IEA Coal Research

Text of a presentation to the Aslib Informatics Group, London, 12th March 1979. This paper is preceded by another, which discusses the IEA Technical Information Service in detail (MacCafferty, M. A technical information service on coal. Aslib Proceedings, 31(*10*), *October 1979, p.* 445–451).

THE SUBJECT COVERAGE of the Coal Data Base is very large and represents an amalgam of the interests of the member countries who supply input. The basic coverage is as listed in the contents page of *Coal Abstracts*:

- *Coal Industry*
  - Energy policy
  - Marketing and economics
  - Regulations
  - Research and development programmes
- *Reserves and Exploration*
  - Exploration
  - Coal reserves and deposits
  - Geology
- *Mining*
  - Surface mining
  - Underground mining
  - Strata and ground control
  - Haulage and hoisting
  - Mine environment
  - Mine equipment
- *Preparation*
- *Transport and Handling*
- *Properties*
  - Physical and mechanical properties
  - Chemical properties and analysis
  - Petrology
- *Processing*
  - Carbonization
  - Desulphurization and purification
  - Hydrogenation
  - Gasification
  - Liquefaction
  - Pyrolysis and cracking
  - Solvent extraction
- *Combustion*
  - Power generation
- *Waste Management*
- *Environmental Aspects*
- *Products*
  - Coke
  - By-products
- *Health and Safety*
  - Accidents and rescue
  - Health hazards

We can clearly see that the 'discipline' coverage involves at least economics, geology, engineering, physics, chemistry, biology and medicine. At present input is donated by the USA, the UK, the Federal Republic of Germany,

Aslib Proceedings, 31 (10), October 1979, p. 452–459. Printed in Great Britain

Belgium, Sweden, the Netherlands, Canada, Japan and Italy; contracts have been placed to cover COMECON countries and France; and a certain amount of input is generated in-house. The input arrives in a variety of forms—magnetic tape in either INIS or US Department of Energy format, paper copy in IEA Coal Research format and paper-copy in the format used by the donor. Input from the US, West Germany and Sweden is indexed by the donors according to the US Department of Energy Thesaurus; input from Canada and the Franklin Institute (which provides the COMECON input) is indexed according to the IEA *Coal Thesaurus*; and other input either is not indexed or is classified using classification schemes based on that used by Charbonnages de France. The Technical Information Service ensures that the indexing is compatible (or added) before adding the input to the database.

However, the programs used by TIS (ICI ASSASSIN MKV) have a full natural language capability, so why does TIS expend time and money on indexing and checking indexing?

To answer this point it is necessary to consider more carefully the role of TIS as a medium of information exchange rather than an in-house information provider. By far the largest quantity of input comes from the US Department of Energy and part of our agreement is that tapes generated from the TIS database are sent to Oak Ridge in exchange. The indexing terms are required by the Technical Information Center (TIC) in Oak Ridge as the RECON on-line system in use at Oak Ridge is largely limited to searching on assigned descriptors. To send TIC unindexed or incompatibly indexed records would not be in the spirit of 'fair exchange'. It is the duty of TIS to ensure that the database records can be put to the best possible use with the minimum of effort and it is hoped that, in the intellectual area of indexing and the preparation of a record suitable for retrieval, TIS has largely succeeded.

However, putting aside the specific requirements of the USA, there are other important reasons why TIS expends so much effort on indexing the input. One of the principal reasons is the simple fact that, of the original twelve member countries, eight do not use English as a first language; it was felt that, in the event of open access on-line or for manual searching of the indexes to *Coal Abstracts*, a simple controlled retrieval language was necessary, in the belief that it is 'bad manners' to expect users whose first language is not English to cope with the vagaries and ambiguities of 'free indexing'. It was also felt that no searching avenue should be denied, so the database is searchable by free language, controlled language, and codes corresponding to the abstracts headings. Access points assigned by the input suppliers are retained—obviously these are not applied to every record but they might prove useful for selecting indexing terms suggested on the document sample retrieved using these additional points of access.

But why, given the stress on international considerations, is the thesaurus an English language document? The general answer is that the users of coal information are faced with a preponderance of English language literature—the non-English-speaking user is forced to accept that English is the major language. The present, first (and largely trial) version of the thesaurus reflects this fact. A purely system language such as classification would involve a double level of translation, effectively compounding translation problems, and, in an international context, the maintenance of a classification system would have posed problems. The thesaurus, then, was intended not only to list and structure the descriptors, but also to guide users through the language, so that it would possibly be used as a 'free language' tool to suggest strategies in free text searching of the coal database or any other database.

English is the best choice because it reflects the literature—there is no literature warrant for Esperanto or UDC because coal literature is written in neither.

The US Energy Research and Development Administration (ERDA), now the Department of Energy, supplied us with about 15,000 abstracts covering Coal Technology (largely Coal Processing). These abstracts were indexed using the ERDA Energy Information Data Base Subject Thesaurus. It is simply obvious that the indexing of the future Coal Data Base had to be compatible with the ERDA system as it existed in 1974. Equally, it was fairly obvious that the deficiencies in the ERDA thesaurus would lie in the mining and preparation areas because at that time the US Bureau of Mines was not part of the Department of Energy. The NCB Technical Intelligence Branch produce a series of abstracts bulletins—the abstracts of which represent the UK input to the IEA Coal Data Base—the most general of which is *Abstracts A: Technical Coal Press*. This abstract bulletin is organized using a version of a classification system developed by Charbonnages de France and the main emphasis is on underground mining. About a year's supply of abstracts from this source were examined and about 200 abstracts were selected and examined in detail in an attempt to assess the strengths and deficiencies of the ERDA vocabulary. The main conclusions reached were that the ERDA thesaurus of the time was weak in its provision of terms in three areas: coal properties and constitution, coal mining and coal preparation and handling. However the infra-structure of the thesaurus appeared to be capable of admitting new terminology in the form of narrower terms of existing descriptors.

However, the ERDA thesaurus as it stood in 1976 was very heavily nuclear biased, being, in its turn, compatible with the International Nuclear Information System (INIS) thesaurus. The problems facing us in indexing coal literature were that potentially useful terminology was 'locked' into the nuclear vocabulary which dominated the general energy vocabulary. Terms were often 'defined' in hierarchies which were only 'true' in the context of the nuclear industry. It is, nevertheless, quite true to say that the Fossil Energy Section at Oak Ridge was aware of these problems and the task of building up a vocabulary suitable for use by the coal industry has been made much easier by the close co-operation of the staff there. For example, 1976,

Screening
USE Nuclear Screening

But screening is a very useful word in the context of coal preparation (it is the separation of solid materials of different sizes by causing one component to remain on a surface provided with apertures through which the other component passes). In the current Energy Data Base thesaurus we now have:

Screening
NTI Nuclear Screening

and in the coal thesaurus:

Screening
RT Classification
RT Particle Size Classifiers
RT Screens
RT Separation processes
RT Sorting

This illustrates one of the easy solutions—when a useful term was encountered which was a synonym of a non-useful term, the two could be separated (often without prejudice to the existing term).

The ERDA and now the EDB thesaurus is liberally supplied with scope notes and definitions—some have been transferred to the *Coal Thesaurus*—but the effect of these is (occasionally) to limit the use of a term rather unnecessarily to a single discipline. To return to the example of 'screening' the word SCREENS had been defined as 'turbine intake barriers for diversion of fish from intake structure'. The solution here was simple—remove potentially (and actually) limiting definitions. A screen in coal preparation is simply a device for carrying out the operation of screening.

Definitions and scope notes can, in a multidisciplinary subject, act as strait-jackets. However, by freeing the terms, one allows the monster of false drops to raise its head (or heads)—but like most monsters the problem is largely mythical. What problem there is, is often caused by searchers of large multi-disciplinary databases failing to define the subject area or use the broad classification codes which are usually supplied. The chances of finding fish in a coal preparation plant should be limited to the canteen.

Terms can also be limited by the hierarchical display: I am never sure whether these displays are meant to define a term or not, but it appears that to most users of thesauri they certainly do. Terms are locked into hierarchies as surely as they are locked in classification schemes. The problem of hierarchies *is* a problem, and for difficult words the use of a single hierarchy can be misleading or simply wrong: COAL is not a subject in its own right nor an 'entity' in its own right but a group of activities centred around a rather elusive substance.

To illustrate, in the 1976 ERDA Thesaurus we had:

Coal
BT Carbonaceous Materials
BT Fossil Fuels.

even at that stage it was clearly recognized that coal could be defined chemically and 'energetically'. In the present *Coal Thesaurus* we have added Sedimentary Rocks to define the term geologically. That is one solution—to use multiple hierarchies to express the possible aspects of a term. Incidentally, that is why COAL is reputed to appear, justifiably, in nineteen separate places in the UDC (although I count five in the English abridged edition:

(i) fuel 662.66 } fossil fuels
(ii) technology 662.74 }
(iii) mineral deposits 553.9 Sedimentary Rocks
(iv) mining 622.33 ,, ,,
(v) petrography 552.57 ,, ,,

Another solution (and here thesauri have a distinct advantage) is to remove the hierarchical structure altogether or at least remove the constraining part of the structure, for example, 1976:

Fuel Slurries
BT Nuclear Fuels.

Obviously, this was not acceptable to us.

We felt that this would be a useful term for indexing articles on Coal/Oil or Coal/Methanol fuel slurries which indeed it has—its structure is now:

Fuel Slurries
BT Fuels
BT Slurries.

The new structure is less restrictive than formerly.

Therefore, we have found that one method of adjusting a thesaurus which could be justifiably regarded as single subject dominated to its new role as a multidisciplinary thesaurus is to consider multiple and less restrictive hierarchical structures.

Tinkering with the related term structure is also useful—I do not think that there can ever be any objection to this—the related terms can be altered to suit any particular need. Certainly the related term structures of the present *Coal Thesaurus* and the EDB Thesaurus are very different in places but this merely reflects the more specific interests of IEA Coal Research compared with the US Department of Energy. We have pruned many of the EDB Thesaurus displays of non-coal-industry related terms.

One of the problems connected with the ERDA thesaurus was that the non-nuclear, *i.e.* non-INIS, part of the thesaurus was heavily US biased (again justifiably—so is the literature). This posed a few problems and may continue to do so in the future because British English and American English are not identical even when the same words are used in the same context.

For example, in British English 'hard coal' is a fairly good translation of the German 'Steinkohle' and means all coal of a higher rank than lignite, but in the USA 'hard coal' is usually taken to mean 'anthracite' thus excluding bituminous coal from its scope. There are problems with 'brown coal' and 'lignite' too—some authorities distinguish between them, but it seems that, for most practical purposes, when the Germans and the Australians say 'brown coal' the French and the Americans say 'lignite' but the coal is essentially the same. In 1976 the ERDA thesaurus looked like this (NTs only):

COAL
NT Anthracite
NT Bituminous Coal

NT Black Coal
NT Brown Coal
NT Lignite
NT Subbituminous Coal.

It now looks like this:

COAL
  Black Coal
    Anthracite
    Bituminous Coal
  Brown Coal
    Lignite
  Subbituminous Coal.

It is obvious that the hierarchies have become more ordered.

In the *Coal Thesaurus* there are the entries:

Hard Coal
  USE Black Coal,

which represents the British English usage but allows better indexing of German articles on 'Steinkohle' (which is, in fact, usually bituminous), and:

Lignite
  USE Brown Coal,

although a note points out that lignite may still be used for retrieval of US literature.

We have attempted to use the structure of the thesaurus to solve a linguistic problem. The hierarchy allows better up-dating (if used) but it should be understood that this is not an attempt to impose some linguistic taxonomy on coal classification systems.

The level of term pre-coordination is often looked upon as awkward—luckily as the thesaurus is largely derived this was no great problem. I feel that this problem or the problem of compound word descriptors is again largely an artificial one, caused by those elements in our profession which seek consistency even at the expense of utility or practicability. If pressed I would apply the following criteria for a given database:

(i) use compound terms if there is a literary (*i.e.* statistical) warrant
(ii) use compound terms to adjust the frequency of descriptor usage
(iii) use compound terms if the split terms could lead to ambiguities in a multidisciplinary subject
(iv) use compound terms to avoid homographs caused by different usage in different fields.

For example:

batteries (of coke ovens)
electric batteries

In general, the indexing and thesaurus policy is that each item should be adequately indexed in its own right—we do not admit a core area and fringe areas as this would create massive problems for such a wide-ranging database. Given the varying interests of our members and clients, it is practically impossible to define the boundaries of the subject. For selection purposes of the word, COAL is the over-riding factor. We have to ask—is this of direct relevance to the coal industry? In answer we tend to err on the generous side but once an item is selected it is indexed without reference to our own particular database. We ask: is this item indexed so that it could be retrieved from a non-coal database?

That is why we index an item on the chemical properties of coal under COAL & CHEMICAL PROPERTIES even though for our own purposes the use of the term COAL is largely redundant—however, it is not redundant when that item is merged with the US Department of Energy Energy Data Base. Therefore, we use indexing terms which, from the point of view of a purely COAL oriented database, have little or no retrieval value, but which can be removed and placed on other databases with complete indexing. I feel that it is important to avoid biased indexing which is useable only with a particular database—this practice is a hindrance to information exchange.

It is in this way that new terms are introduced—if the EDB thesaurus cannot provide an indexing term for a particular article then the indexer is forced to look elsewhere. The Thesaurus of Engineering and Scientific Terms (TEST) is an obvious choice and we have noticed a large measure of compatibility between EDB and TEST. However, most of the extra terms required were spotted in the initial stages of setting up the database and were inserted after discussions with the US Department of Energy Technical Information Center.

It is clear that the *Coal Thesaurus* is almost completely compatible with the EDB thesaurus which, in its turn, is compatible with the INIS thesaurus. The US Department of Energy supplies a large part of the NTIS data base and thus the *Coal Thesaurus* is a useful tool for searching that file for coal industry information in US reports. It can of course be used to suggest useful free language terms for searching other databases, for example, Engineering Index or Chemical Abstracts.

The layout of the thesaurus is fairly standard: It employs USE/UF (UF means 'used for' and indicates the non-preferred term from which reference is made), BT (broad term), NT (narrow term) and RT (related term). UFC, meaning 'used for' and indicating the non-preferred term for which the main term is one of the substitute descriptors, is the reciprocal of USE/AND, for example:

Airborne Particulates
USE Aerosols
AND Particles.

SF, meaning 'seen for' and indicating the non-preferred term for which the main term is a more specific substitute term, is the reciprocal of SEE/OR, which indicates more specific indexing terms which should be more useful than some rather vague terms, for example:

Workings
SEE Coal Mines
or Mine Roadways
or Mines
or Tunnels.

Terms are supplied with scope notes which explain their use in indexing or retrieval and certain terms are defined—mainly named processes.

The thesaurus, being a first edition, is largely illustrative of the way future editions might appear. It is expected that our database will be available on-line in 1980 (via Euronet or other commercial services) and we hope to have a revised and extended thesaurus available then. Obviously, there will be more terms reflecting the growth and development of the database.

It is hoped that the 'lead-in' vocabulary will be extended to improve the thesaurus as a tool for free language searching (and of course for indexing) and this will also mean extending the use of the USE/AND (UFC) and SEE/OR (SF), to accommodate the extra 'non-preferred' vocabulary. The question of whether to extend or discontinue the use of definitions remains open.

It may be necessary to provide some kind of multilingual access vocabulary to the database to help non-English-language users. We have begun tentatively with French but there is probably more need for a German access vocabulary. Because the thesaurus is compatible with the INIS thesaurus to a large extent, many of the terms are already translated into French and German. We are also considering linking the thesaurus terms to the classification systems used by some of our member countries but this would have to be a longer-term project.

Finally, it should be clearly understood that the thesaurus is a byproduct of the indexing effort applied by IEA Coal Research and its collaborators—it is not, in any way, a final finished product. It represents the status of our database on the day the thesaurus was 'frozen' for printing and its usefulness outside our organization is a reflection, not of the inherent worth of the document itself, but of the work and effort that has gone into the indexing of the database—and here we should recognize the valuable contributions of colleagues in Canada, the Federal Republic of Germany, Sweden and the USA.

UK abstracting and indexing services—some general trends

H. East

THE RECENTLY PUBLISHED *Inventory of abstracting and indexing services produced in the UK*[1] provides a considerable amount of both 'hard' and indicative data from which some general trends in the development of abstracting and indexing services can be deduced. A study of these trends was undertaken and the findings have just been published in the BLRDD report series.[2] This paper presents, in a summary of those findings, information about the size, longevity, ownership and scope of such services.

The inventory is not an ideal source of data on all aspects of abstracting and indexing services. Moreover, a number of entries in the inventory are incomplete in some way. There are also a few inconsistencies in the presentation of services: this stems mainly from inconsistent interpretation by the service producers of the questionnaire they were asked to complete and perhaps some occasional overstatement. The compilers of the inventory recognize that there are 'no doubt omissions' as indeed there are (two have been noted in this study and another two possible entries have been suggested in a recent review).[3] However, it must be accepted that all surveys of this nature are likely to be to some extent incomplete. It seems to me (clearly a subjective judgment) that such omissions and inconsistences as do exist in the data presented in the inventory are unlikely to alter considerably the overall trends indicated in this paper, nor to modify the numerical estimates by more than a few per cent.

A more detailed discussion of the problems encountered with the inventory data, and to what extent, and how, these were dealt with, is contained in the BLRDD report.[2]

Data elements

For each service listed, the inventory gives some or all of the following data elements:

*Name of service
*Producer
Telephone No.
Contact (person)
Frequency (times/year)
*Scope
Total no. of items
*Starting date
*Average no. of items/year
Source of input
Languages covered
Form of indexing/thesaurus
*Form of output

The elements indicated with an asterisk (*) were used in compiling the report and this paper. The main reasons for disregarding the other elements were:

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they were not statistically interesting (*e.g.* telephone number, contact (person)); they were too incompletely reported (*e.g.* total number of items); and they were too heterogeneous or equivocal (*e.g.* form of indexing/thesaurus).

The 'total no. of items' (*i.e.* cumulative total) is an unfortunate omission but, curiously, a large number of services either did not know the number or were unwilling to reveal it.

For 'language coverage' some services plainly list the languages covered. Quite a large number make somewhat ambiguous, and questionable, claims, for example, 'all', 'almost all', 'all major', 'most', 'English and some other European languages' and 'English and others as necessary'.

The 'form of indexing/thesaurus' element contains too many imponderables to permit useful analysis, for example, 'thesauri' characterized by peculiar acronyms, 'self-indexing classification scheme', 'part-controlled descriptors', 'non-controlled descriptors' and—what should surely qualify as the PANGLOSS scheme—'controlled, semi-controlled and free descriptors'.

In the majority of, but not all, cases the 'producer' is synonymous with the publisher. For this analysis the producers have been grouped into the following classes:

—academic,
—learned/professional societies and institutions,
—research/development/trade associations,
—commercial,
—government,
—local government,
—international.

The international class was introduced to accommodate international services —to which UK institutions are contributors—not readily placed in the other classes. Some of these services are very large (particularly the Commonwealth Agricultural Bureaux) and unless dealt with separately tend to distort the overall picture. Also included in this class are:

—UKCIS contributions to Chemical Abstracts Service,
—BL contributions to MEDLARS,
—Transport and Road Research Laboratory contributions to IRRD (OECD),
—the International Food Information System (IFIS),
—Aquatic Sciences and Fisheries Information System (ASFIS),
—Children's Literature Abstracts (IFLA),
—UKAEA contributions to INIS (IAEA),
—MAFF/CAB contributions to AGRIS (FAO).
(The last two services were not included in the inventory.)

Services in the inventory are indexed 'according to broad subject division'. For the purposes of this study these subject headings were subsumed under the following six broad classes:

E. Engineering, technology and applied sciences;
P. Physical sciences;

L. Life sciences, medicine;
S. Social sciences;
A. Arts, humanities, other;
G. General.

A number of services appear under several subject headings and in more than one of the classes given above. In such cases services have been counted as having a scope of more than one subject. There is no way of telling from the inventory what proportions of a particular service fall in one or other of the classes: it is possible that some services contribute little (numerically, in terms of references) to some of the subject categories to which they have been assigned. This makes the statistical indicators relating to the subject scope of services less reliable than the other service variables considered in this study.

General findings

The inventory, and consequently the data used in this report, contain information about *services current at 30 June 1977*. It has, however, been assumed that services which indicated in the inventory that they would supply magnetic tape from 1978 have accomplished this aim. In this context it is to be noted that not all the services using computers, and thus producing machine readable files, make these files publicly available. The number of machine-readable references quoted here is almost certainly higher (by an unknown amount) than the number which is available in this form as output services.

The general findings of this study are summarized in Table 1: General statistics of UK abstracting and indexing services, and Table 2: Producers—service statistics. Particular characteristics of services are summarized in the figures which follow and the comments which accompany them.

Number of service producers (publishers)	157
Total number of services	339
Total number of services available in machine-readable form	101
Number of abstracts services	231
Number of titles and other services	108
77 per cent of services are less than twenty years old	
49 per cent of services are less than ten years old	
Number of references published annually	2.9 million
Number of references published annually in machine-readable form	2.0 million (71 per cent of total)
Number of abstracts, annually	1.8 million (72 per cent machine-readable)
Number of titles and other references, annually	1.1 million (65 per cent machine-readable)
66 per cent of all service producers are located within a fifty-mile radius of London	

TABLE 1: *General statistics of UK abstracts and indexing services (mid 1977)*

PRODUCER TYPE	Commercial	Government	Local Government	International	Learned/ Professional Society	Academic	Research Association
NO. OF PRODUCERS	31	30	4	9	31	20	32
NO. OF SERVICES							
Abstracts	74	29	4	46	25	13	40
(Machine readable)	(23)	(4)	(1)	(29)	(4)	(3)	(17)
Titles and other	15	24	2	3	19	40	5
(Machine readable)	(3)	(5)	(–)	(3)	(7)	(1)	(1)
All	89	53	6	49	44	53	45
(Machine readable)	(26)	(9)	(1)	(32)	(11)	(4)	18)
ANNUAL INCREMENTS (IN THOUSANDS)							
Abstracts	923	128	15	257	269	51	134
(Machine readable)	(700)	(67)	(9)	(213)	(192)	(26)	(77)
Titles and other	372	183	2	42	322	145	42
(Machine readable)	(330)	(62)	(–)	(42)	(283)	(5)	(0.5)
All	1,295	311	17	299	591	196	176
(Machine readable)	(1,030)	(129)	(9)	(255)	(475)	(31)	(27.5)
AVERAGE NO. OF REFERENCES/SERVICE (IN THOUSANDS)	14	6	3	6	13	4	4

TABLE 2: *Producers—service statistics (mid 1977)*

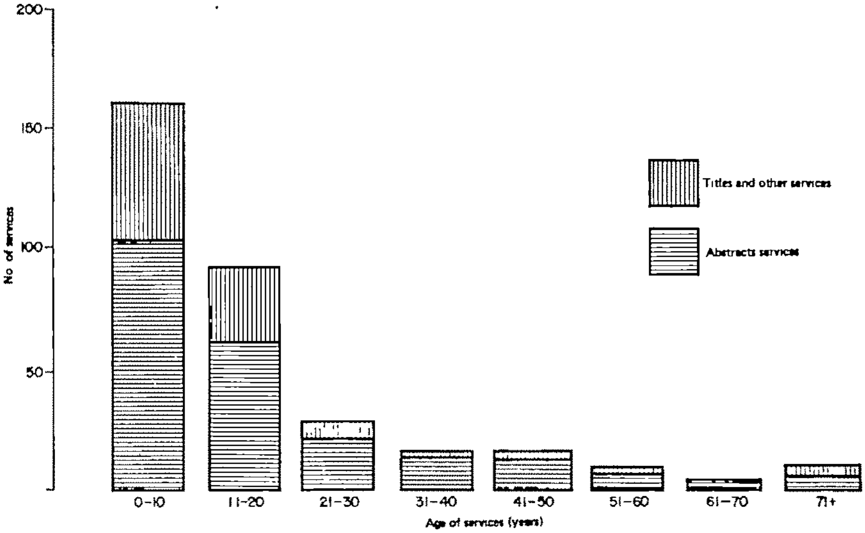

FIG. 1: *Age of extant services*

Age of services

Data were available to identify the ages of 331 discrete services; these are displayed in Figure 1. Note that these data do not measure the *growth* of services since there is no information on services which have started during the periods under consideration and then ceased.

However, it can be deduced from *extant* abstracting and indexing services in the UK that:

—77 per cent have been established in the last twenty years (73 per cent of abstracts services);
—88 per cent were established after World War II (87 per cent of abstracts services);
—the 'peak' creation year for (extant) services was 1976, when twenty-three new services were launched, thirteen of them abstracts services.

The last statistics should be considered with reference to the nature of the growth of services. Recent growth is characterized by two factors: the emergence of new producers of services and—numerically more significant—the provision of new services by already established publishers through 'spin-off', repackaging, and expansion of their subject scope coverage. Notable contributors to the latter type of growth are the Commonwealth Agricultural Bureaux, the Biomedical Information Service (Sheffield University) and Information Retrieval Ltd. All three of these producers are specifically active in the life sciences field.

Figure 2 gives clear indications of these trends. Here it is shown that the number of *new producers* has grown considerably in the last twenty years (106 new producers—66 per cent of all producers—between 1958 and 1978). However, the number of *new services* has grown even more rapidly (255 new services —77 per cent of all services—between 1958 and 1978). More recently, *since* 1969, forty-six new producers have appeared; during this period 161 new services—49 per cent of all services—have been launched. Of these 161 new services, 96 have been launched by producers *already active* before 1969, and 64 of these new services are the outputs of only three producers: Biomedical Information Service, Commonwealth Agricultural Bureaux, and Information Retrieval Ltd.

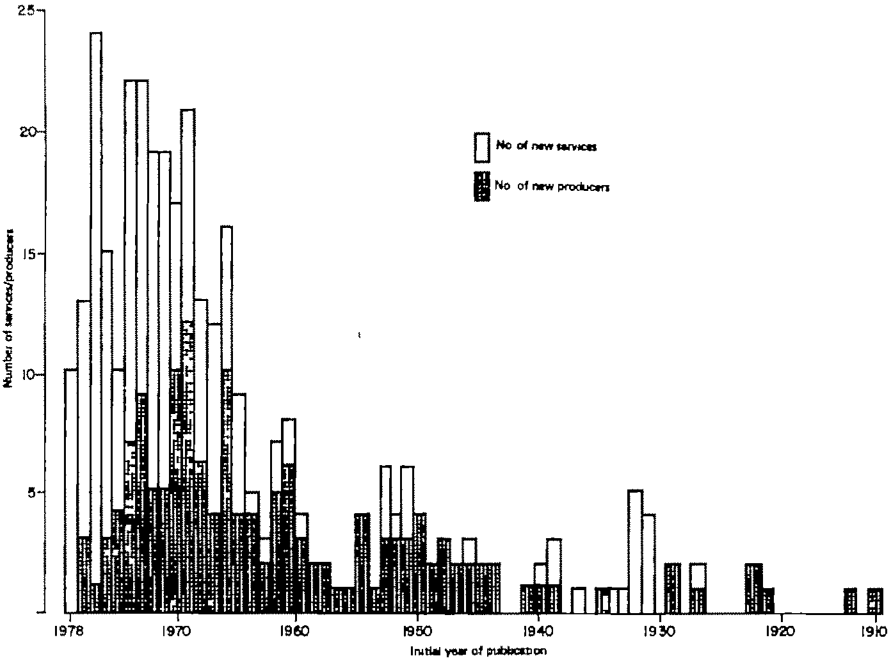

FIG. 2: *Development of services and service producers*

In Figure 3 the age of services in terms of the various types of service producer is displayed.

The most noticeable feature of these data is the recent and rapid growth of services from commercial, academic and international producers. It is also to be noted that the majority of new services are abstracts services. (The large number of new titles services from academic publishers is mainly attributable to the Biomedical Information Service.)

The rapid growth in number of services provided by the above-mentioned type of producers—as illustrated in Figure 3—taken alone, could lead to a false impression as to their share of and importance in the contemporary UK information 'market'. As will be shown subsequently, the learned societies and research associations, while not expanding the number of services so rapidly, are working

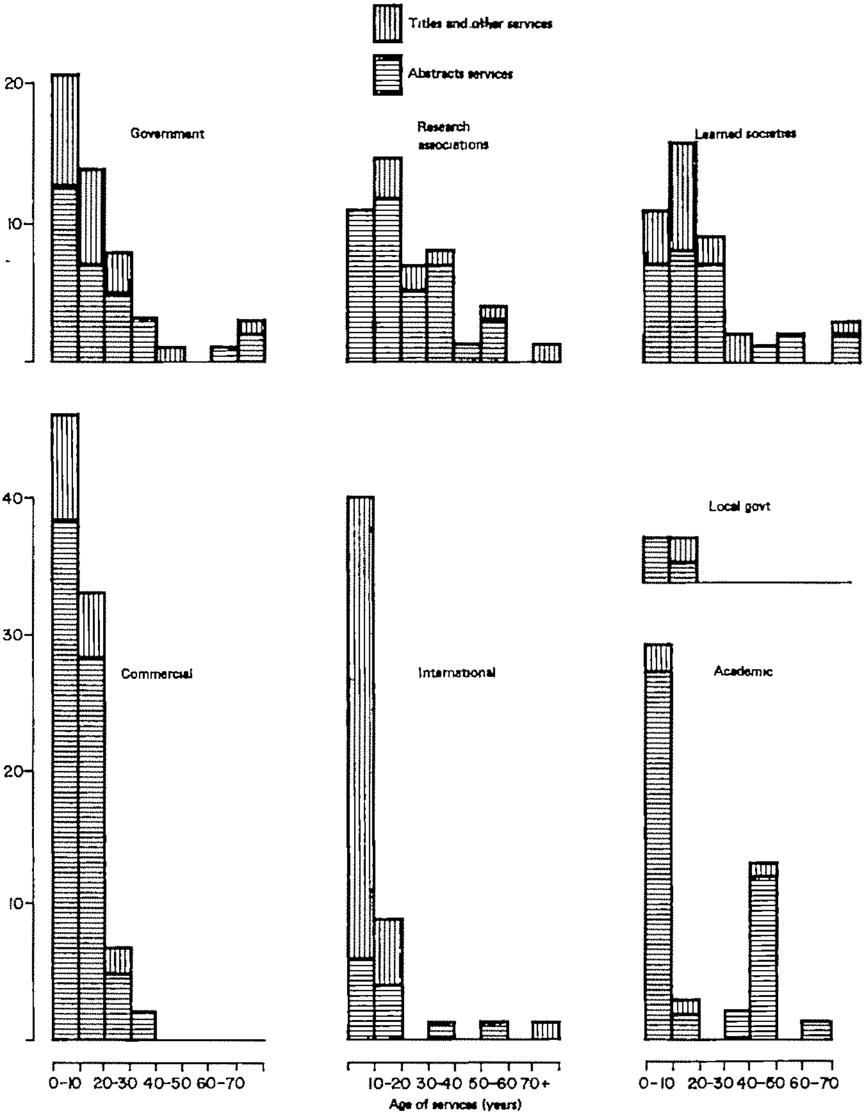

FIG. 3 · *Age of extant services by producers* from considerable service bases, consolidated to a large extent before the rapid growth that has occurred in the last ten years.

Producers and services

Data is available for 156 producers and 339 services: Figure 4 displays the number of service producers of various types and the number of services they provide. The number of services in machine-readable form is also indicated.

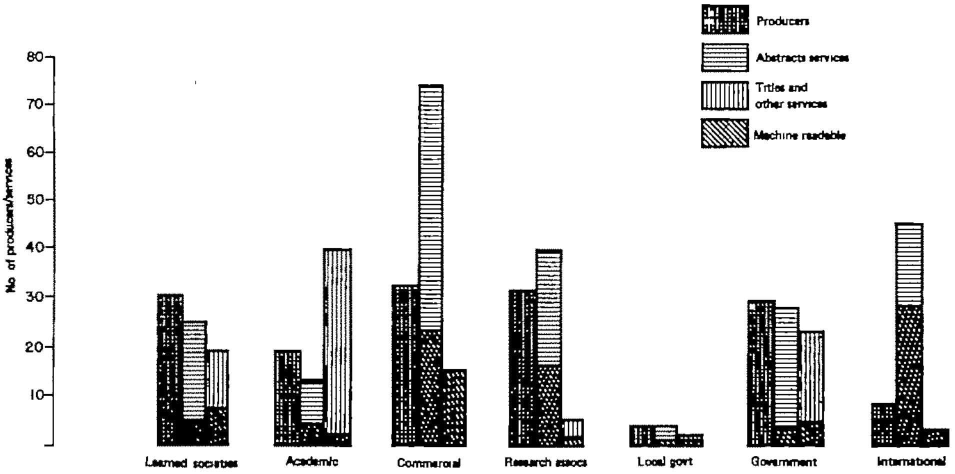

FIG. 4: *Producers and services*

ANNUAL INCREMENT (NO. OF NEW REFERENCES PER ANNUM)	PER CENT OF TOTAL NO. SERVICES
Under 1,000	23
1,000–5,000	42
5,000–10,000	17
10,000–20,000	10
20,000–100,000	6
over 100,000	5
	100

TABLE 3 *Distribution of service sizes*

These data give no indication of the size of services in terms of the number of references published annually ('annual increment'). In fact the inventory ranges from services publishing a few hundred references per year to one publishing nearly half a million. Table 3 illustrates the distribution of service sizes in terms of annual increments, based on data available for 319 services.

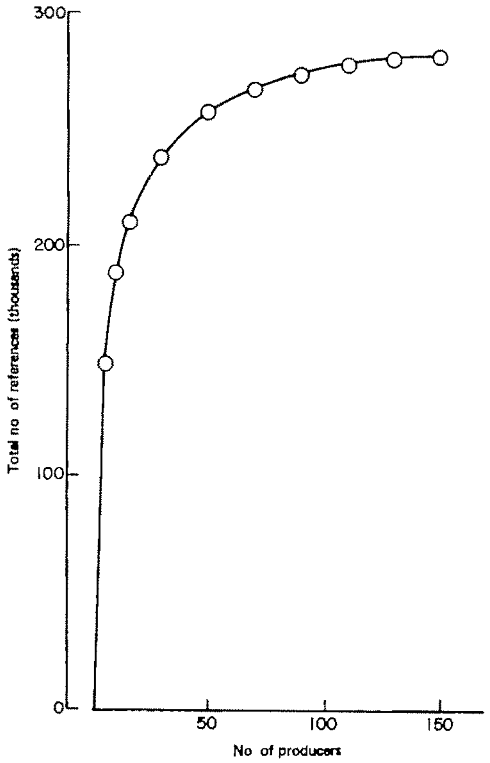

FIG. 5: *Cumulative totals of annual service increments (all references)*

Figure 5 represents graphically the cumulative totals of annual increments of each producer, starting with the largest. From this figure it can be deduced that 25 per cent of the UK annual increment comes from two producers, 50 per cent from four producers, 75 per cent from fifteen producers and 90 per cent from approximately forty-five producers.

Table 4 gives the 'size' of services, in terms of the annual increment of references, for various types of producer.

Figure 6, by displaying these data as a set of 'pie charts', illustrates rather clearly the proportions of the market (in terms of production volumes) held by the various categories of producer. A rather different picture is obtained when the number of references published annually is considered rather than the number of services. Thus, for example, commercial producers are responsible for 26 per cent of current services but 45 per cent of the annual volume of references published, and 51 per cent of machine-readable references. By contrast academic producers control 16 per cent of current services yet are only responsible for 7 per cent of the annual volume of all references, and 2 per cent of machine-readable references.

	NO. ABSTRACTS REFERENCES (THOUSANDS)	NO. TITLES REFERENCES (THOUSANDS)	TOTAL: ALL REFERENCES (THOUSANDS)
Learned societies	269	322	591
Academic	51	145	196
Commercial	923	372	1,295
Research assoc.	134	42	176
Local govt.	15	2	17
Government	128	183	311
International	257	42	299
TOTAL	1,777	1,108	2,885

TABLE 4: *Annual increments of references*

Subject scope of services

The data presented in the inventory which relate to subject scope cannot be subjected to the same degree of confident analysis for the reasons given earlier. However, indications of trends can be deduced. Figure 7 presents data concerning the subject scope of services and the age of these services. In addition the figure indicates when producers who are now active in a particular subject field started their publication activities.

While the number of services, and producers involved, has increased recently in all subject areas, the most significant growth has been in the areas of life sciences, engineering subjects and social sciences. A particularly interesting feature of these data is that 50 per cent of all service producers are involved in engineering information. The relatively small amount of growth in numbers of services in the physical sciences (unrelated to the large growth of the literature in this area) is probably attributable to the early establishment of broad-based disciplinary services such as Chemical Abstracts and Physics Abstracts. The existence of these services has to some extent pre-empted the development of small, entrepreneurial services which has occurred in other subject fields.

Figure 8 presents data relating service producers to the subject scope of services.

Perhaps the most striking (though unsurprising) feature of these data is the high contribution and concentration of the research associations in the engineering fields—their traditional area. Academic producers are only numerically significant in the life sciences field (mainly attributable to the Biomedical Information Centre). The large concentration of international services in the life sciences field is mainly attributable to the Commonwealth Agricultural Bureaux services.

Note that the relatively large number of services in the engineering and life sciences field does not necessarily imply that the annual increments in these fields are high. However, in the case of life sciences (which here includes medicine), more than half a million references are published annually by four large producers alone: the Commonwealth Agricultural Bureaux, Information

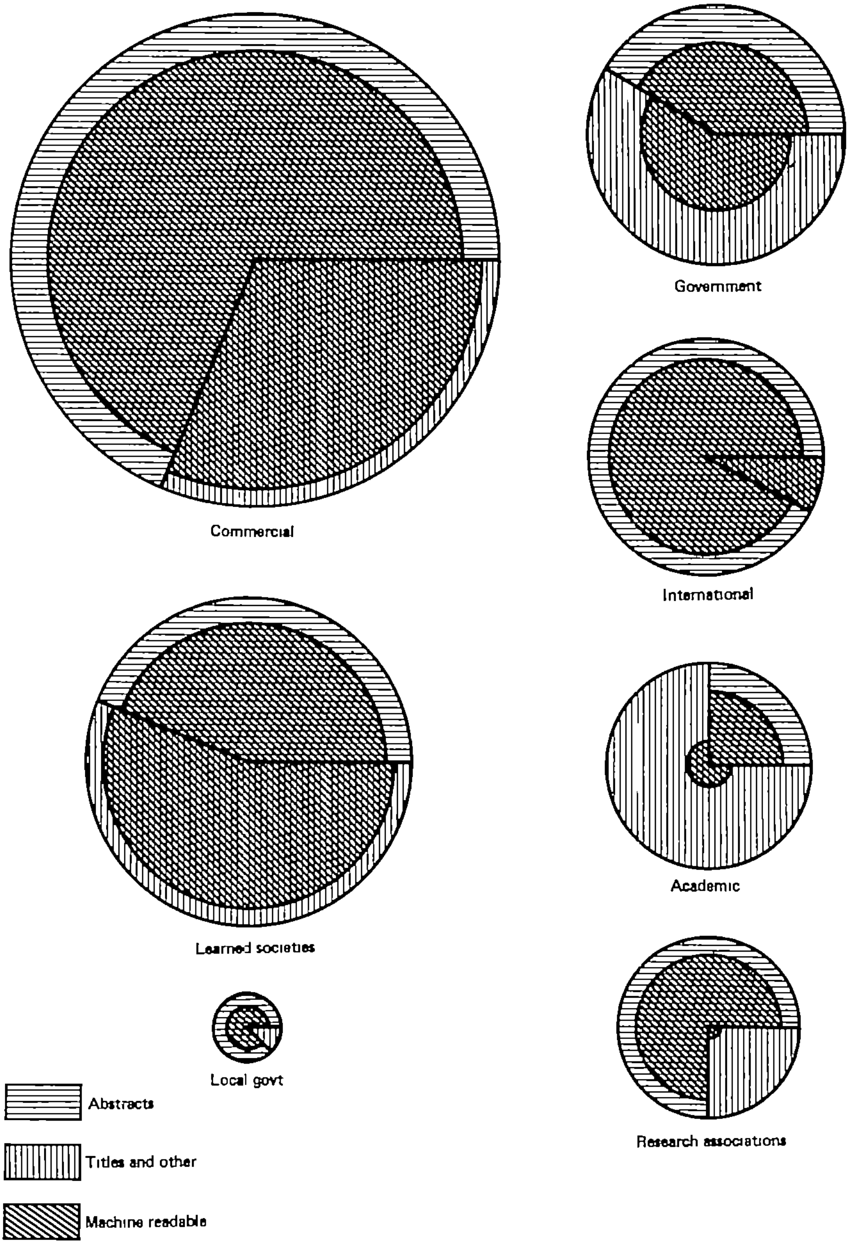

FIG. 6: *Production volumes (note: areas are proportional to annual increments 'published')*

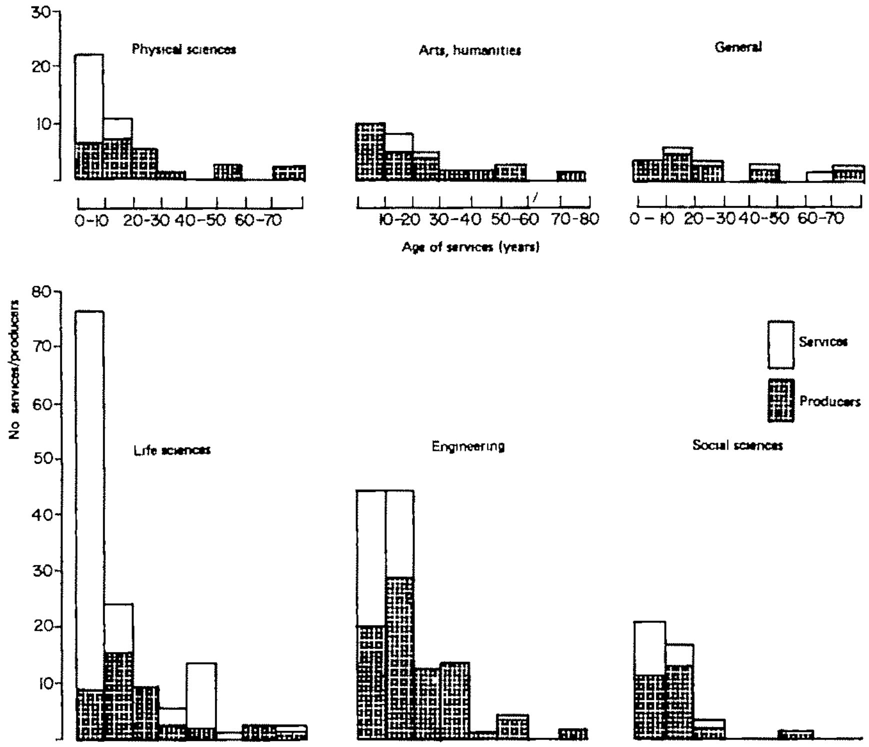

FIG. 7: *Subject scope and age of services*

Retrieval Ltd., Biomedical Information Centre and the Zoological Society. In engineering, INSPEC, the research associations as a group, and the Metals Society account for about 400,000 references per year. Neither of these estimates includes a considerable number of references to life sciences and engineering available through the very large Derwent Publications and Patent Office services.

Geographical distribution of service producers

There is a heavy concentration of service producers within South Eastern England: 66 per cent are located in London or within fifty miles of London, as shown in Table 5.

Some observations

Spin-off services and repackaging

The considerable growth of new services in the past ten years or so can be attributed to a large extent to activities known as 'spin-off' and 'repackaging'. The terms are not used in a precise manner and are often presumed to be synonymous, but can be taken to mean the following:

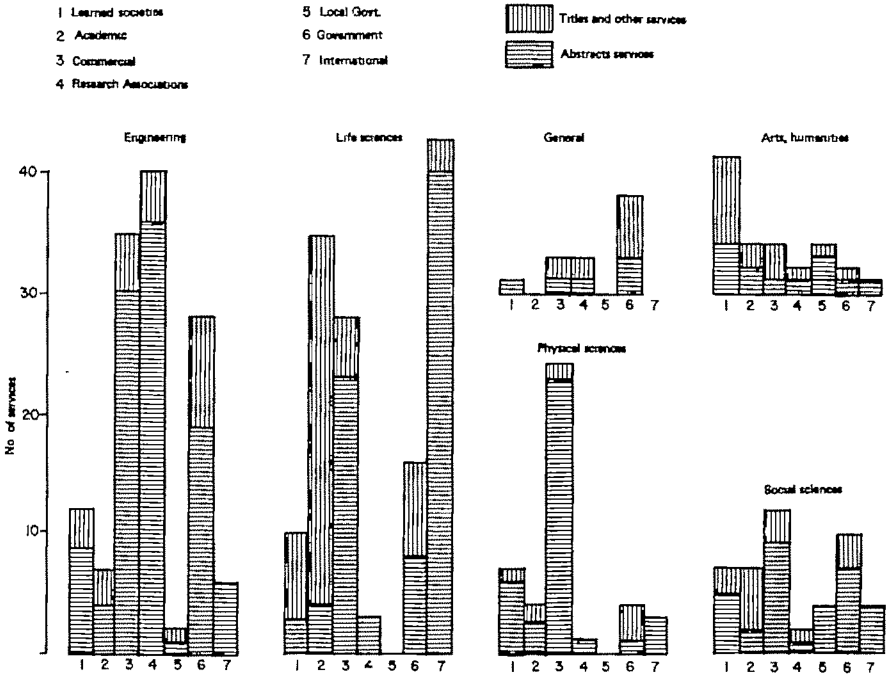

FIG. 8: *Producers and subject scope of services*

LOCATION	NO. OF SERVICE PRODUCERS
London (postal districts)	75
Within fifty miles of London	30
Elsewhere in England	49
Scotland	2
Wales	2

TABLE 5

A spin-off service is one which is entirely created from an existing database, with little or no additional intellectual intervention. It can consist, for example, of the whole or part of the database treated mechanically to provide all or part of the references in a different format. An example is the Current Papers service of INSPEC where the titles journals are simply an extract of the fuller abstracts journals database.

A repackaging service is usually also mechanistic in its operations but often implies some editorial intervention. Usually a repackaged service is a subset of a larger database selected and reformatted according to its subject content.

In rare cases it can be created from merging or 'melding' records from discrete databases (*e.g.*, the TOXLINE database derived from extracts of the databases of Chemical Abstracts, BIOSIS and MEDLARS).

One of the cogent arguments for adopting computer production techniques is that spin-off and repackaging activities are made easy and economically attractive thereby. There is undoubtedly much truth in this. However, the data provided by the inventory, with some interpretation, does *not* support speculation that the introduction of computerized production techniques has been a significant causal factor in the increase of new services in the UK. Less than one-third of all services are available in machine-readable form.

An examination of the ten most prolific producers (in terms of numbers of services) shows that they are responsible for 136 services. Five of these producers (twenty-nine services) do not use computerized production methods. Of the remaining five, the services of three producers (INSPEC, Derwent, IRL) were *initiated* independent of computer production; and the seventeen 'new journals' of CAB (repackages) are produced manually.

Market shares

Commercial producers form the predominant group both in terms of the number of services provided and the annual increments of references published. These services are almost wholly post-World War II creations. A large proportion are abstracts services, a relatively high number of which are machine-readable. Six of the largest ten service producers are commercial. Commercial producers are most active in the engineering, life sciences and physical sciences fields.

The learned and professional societies are the second largest producers in terms of annual increments, a high proportion of outputs being machine-readable. The societies are long-established producers of services and their recent growth of new services has been relatively low. The services tend to be large in terms of output. The societies are active producers in all six broad subject areas.

The growth in government-sponsored services has been the most uniform. Less than half are abstracts services. Government bodies are the main supporters of international (usually intergovernmental) services which have grown more rapidly (and have been counted separately): the annual contribution to intergovernmental services is almost as large as to strictly national services. Government is specifically active in engineering, life sciences and social sciences. The services tend to be medium sized (average 6,000 per annum) producing a rather low proportion of machine-readable references.

Of the nine international services, five (CAB, IRRD/TRRL, INIS/UKAEA, MEDLARS/BL, AGRIS/MAFF) are clearly intergovernmental, two (IFIS, ASFIS) are partially intergovernmental, and two (UKCIS, IFLA) are 'intersociety'. The international services are mainly abstracts services, largely machine-readable. The predominant area is life sciences (which here includes food sciences, fisheries, agriculture and medicine).

Services from academic producers are atypical in that they are relatively small, the majority are titles services and only a small proportion of the references are

	FOR-PROFIT	NOT-FOR-PROFIT	GOVERNMENT
USA	35%	40%	25%
UK	45·5%	34·5%	20%

TABLE 6: *Sources of published abstracting and indexing records*

machine-readable. The amount of growth in their number in the last ten years is the second largest of all producer types. Academic producers are mainly active in the life sciences, social sciences and engineering fields.

Services from the research associations have grown steadily over sixty years. They are small, mainly specialized abstracts services, preponderantly in the engineering field.

The number of services from local government sources is small and of recent date. The services are themselves small and are related to social services and the engineering and aesthetic aspects of town planning.

Figures from a recent publication by Burchinall[4] permit comparisons of patterns of ownership to be made between the UK and the USA (Table 6). Producers are classed as 'government', 'for-profit' and (somewhat coyly) 'not for-profit'. The latter class includes those organizations which are not overtly commercial in their objectives, for example the learned and professional societies. Subscribers to the services of 'not-for-profit' organizations—on either side of the Atlantic—will appreciate that their producers may still be aware of the practical difference between the net and the gross, and the possibilities thereof.

Burchinall also indicates that there were approximately fifty-two million records available worldwide from secondary services in 1975. This would indicate that the UK share of the world's production is currently about 5 per cent.

Systematic study of overlap between UK services is not possible using the limited data available in the inventory. Nevertheless, even non-systematic scanning readily produces examples of overlap consistent with the trend towards 'market orientation' in service provision, for example:

—Applied Ecology Abstracts, Studies in Renewable Natural Resources; published by Information Retrieval Ltd.; starting date 1975; 12,000 items/year.
—Current Advances in Ecological Sciences; published by Sciences, Engineering, Medical & Business Data Ltd.; starting date 1975; 12–14,000 items/year.
—Ecological Abstracts; published by Geo Abstracts Ltd.; starting date 1974; 5,000 items/year.

Acknowledgement

The data used in compiling this paper were collected in a study financed by the British Library Research and Development Department.

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4 BURCHINALL, L. G. International transfer of scientific and technical information, *The Serials Librarian*, 1977, No. 1, p. 353–64.

Local current awareness services in industrial libraries

J. E. Rowley

Lecturer, City of Birmingham Polytechnic,
Department of Librarianship

THE CLIENTELE of industrial libraries have long enjoyed the library's assistance in keeping abreast of their subject field. Effective current awareness services minimize the time users spend in keeping up-to-date. In recent years remaining adequately informed has become increasingly more arduous. There have been increases in the total amount of information, together with an expansion of the number of documents with which an information user needs to be conversant. Wider scattering of information on any one subject over several sources aggravates the situation further. Such trends not only make comprehensive current awareness programmes more vital, but also make them more difficult to maintain. What has been the impact of such pressures on current awareness activities in industrial libraries?

External, commercially available current awareness services have always been viewed as an alternative to local services. With the introduction of mechanized databases, the products of external vendors may be tailored more precisely to specialized information requirements. Thus the commercial services present an even greater challenge than previously to local services. Nevertheless, local services continue to flourish and have not yet been supplanted by external services. Their continued existence can be explained by their unique suitability for a particular audience. Not only can items not covered by external services, because they are too short or are to be found in local company sources, be covered, but also their treatment may be slanted. The time lag before the publication of an item (or more precisely its arrival in the library) may be minimized by a good local announcement medium. And, lastly, a local service may be the most economically attractive alternative. Quite apart from the cost of supplying external services to a relatively large number of users, several services may be necessary to keep just one user properly informed. So, although they may be used alongside external services, local services still have a vital role.

This paper looks at practice associated with 321 local current awareness services which are produced by 147 industrial libraries and information units. These libraries were some of the respondents in a more comprehensive survey which studied academic, public and special libraries, a more general account of which is to be found in an earlier issue of *Aslib Proceedings*.[1] Whitehall[2] and Walker[3] discuss information bulletins in special libraries. This work places information bulletins in their context amongst other types of current awareness services.

Aslib Proceedings, 31 (10), October 1979, p. 476–484. Printed in Great Britain

SUBJECT	NO. OF INFORMATION UNITS COVERING SUBJECT	
		%
General	24	16
Science	97	66
Commerce	62	42
Management	84	57
Engineering/Technology	111	76
Humanities	3	2
Social Sciences	10	7
Other	17	12

TABLE 1: *Subjects covered by information units*

The libraries and information units

The industrial libraries surveyed were generally fairly small; 88 per cent acquired less than 500 current periodical titles, and a further 10 per cent received between 500 and 1,000 titles. Their subject coverage often centred on a specific topic, for example: petroleum refining, pharmaceuticals, paint, materials handling, international trading and business, medicine, computer science, economic aspects of the energy industry, marketing, health and safety, fasteners, architecture. Nevertheless, as Table 1 illustrates, their stock was frequently multidisciplinary. Libraries were asked to tick those disciplines which their information activities handled. Many libraries were involved in several disciplines. Not surprisingly, 89 per cent were covering either science or technology, although the remaining 11 per cent should not be overlooked altogether. It is interesting to note that a sizeable fraction of information units were devoting some of their resources to management information; most (*i.e.* 85 per cent) of these libraries were also covering engineering and technology. With this information about the libraries producing the current awareness services we move on to examine their current awareness programmes.

Libraries with no current awareness services

Only a small portion of the libraries (*i.e.* twenty-two, or 15 per cent) were not generating any current awareness service locally. Of these twenty-two, nineteen had a total library and information staff of two full-time equivalent staff or less. Some managed with only one part-time member of staff. Nevertheless, some of these libraries were making valiant attempts to disseminate information. One librarian who ticked 'no services' mentioned organizing journal circulation, and a further two libraries scanned journals and marked them up for recipients. Some of the remaining libraries were branch libraries which were able to profit from centrally compiled current awareness services, whilst other libraries resorted to external commercially available SDI or current contents services. Current awareness services then are produced by all but the smallest of industrial libraries in this group. But how significant a part of the information unit's activities are current awareness services, and to what extent can such services be replaced by centrally produced or commercially produced services?

Centrally produced services

Several units benefited from services compiled elsewhere in the company. Typically, patents bulletins issued by central patents departments or patents officers, and press cuttings bulletins from company publicity departments, may augment the library's own services. Branch libraries may also profit from bulletins and other services initiated by headquarters libraries and information services. The central generation of current awareness services is economical in terms of manpower and resources and may elevate indexing and abstracting standards, but centralization can detract from feedback and from the interaction between the service provider and the user. One library distributed SDI which was received from the central library, and thus only needed to supply an accessions list locally. Some branch libraries are responsible for contributing to centrally produced bulletins; this keeps them involved and portions out effort. One library contributed from documents held on the site to an events bulletin, an accessions list and a titles bulletin.

External services

External secondary services, such as SDI, current contents or abstracting and indexing services, may be viewed as an alternative to local services. For instance, one librarian was considering discontinuing patents, current contents and abstracts bulletins to release staff from a lot of manual labour. These bulletins would be superseded by UKCIS CA Selects and CASIA SDI services. Another library offering only a simple patents bulletin used UKCIS SDI by circulating relevant cards to members of the research and development department. But the following comment reflects a far more typical attitude: 'I do not have a very high opinion of commercial databases and SDI services.' Most librarians treated commercial services as supplementary tools. External services might be purchased for users with interests foreign to the library's normal line of business, or they might be scanned (by man or machine) to supplement other local scanning. One library circulated the American Petroleum Institute patents and abstracts bulletins, and another circulated Derwent Publications services. ISI's current contents services were cited by three libraries and the SDI services which were mentioned included INSPEC, ASCA and BA.

Local current awareness services

It has been established that, despite the alternatives, most industrial libraries engage in the production of their own current awareness services, but how significant is their commitment? Table 2 starts to answer this question, and shows that many libraries were offering not just one service, but a series of services. Different types of service are appropriate depending on the circumstances; a library may circulate a patents bulletin to one group of users, an abstracts bulletin to another and a press cuttings bulletin to yet another. Table 3 lists the numbers of the various kinds of bulletin in use. It appears that the accessions list, followed by abstracts bulletins and SDI, are the most popular

NO. OF SERVICES	0	1	2	3	4	5	6+
NO. OF LIBRARIES	22	22	25	25	19	12	15

TABLE 2: *Number of current awareness services per library*
(Each service marked on the questionnaire was marked as a separate service, whether or not it was published jointly with another service. Also a series of, for example, four abstracts bulletins on different topics would be counted as four services.)

TYPE OF SERVICE	NO. OF SERVICES
Patents bulletin	27
Events bulletin	28
Abstracts bulletin	43
Current contents	15
SDI	35
Press cuttings service	3
Press cuttings bulletin	32
Accessions list	59
Titles bulletin	18
Reports list	27
Combined bulletins	27
Others	7
TOTAL	321

TABLE 3: *Types of current awareness service*

forms of dissemination, although none of the others are insignificant. Services which in Table 3 were included under the heading 'others' and which merit a remark on their originality include a book reviews bulletin, a standards list, a periodical holdings list, occasional technical notes, a commercial information bulletin geared to competitive companies, and a weekly gossip sheet masquerading under the appellation *Grapevine*. One library rated staff representation on committees as valuable in updating.

Joint publication of a number of different forms of service is not uncommon. For instance, one library issues an events bulletin, current contents bulletin, accessions list, reports list and titles bulletin in a single six-weekly publication. Although the amalgamated abstracts bulletin, accessions list and reports list is the most common, any of the bulletin-format current awareness services may be combined. For a joint publication to be effective, the audience and the desired time lag must be compatible for two or more bulletins. Where a series of distinct bulletins are distributed, these are normally designed to serve different groups, for example, to send to different subsidiary companies, or to cover different topics. A common division is between marketing and technical bulletins, but some libraries may also produce a series of technical bulletins, on different aspects of the company's activities, such as household products, toiletries, packaging and regulatory affairs. Some citations, particularly of documents on management, may appear in more than one bulletin.

Scanning is one of the most fundamental activities in a current awareness programme. Most of the SDI services cited were manual, and were no more than a spin-off from routine scanning of new material. A few libraries merely scan for SDI and perhaps to compile an index, but generate no other updating services. One library for instance devoted twenty hours a week to an informal SDI programme and offered no other services. Three other libraries operated substantial manual SDI systems as their main current awareness provision; one of these claimed to operate 150 profiles. In most instances, manual SDI amounted to dispatching photocopies of pertinent articles. Feedback is less direct about this type of SDI than about some other announcement media, and very often absent.

Current contents services are normally a collection of the title pages of current journals. They may be selective, in that each user receives a unique set of title pages, or copies of all title pages may be dispatched to every reader. Current contents services can be viewed as an alternative to journal circulation. One library circulated contents pages instead of circulating the whole journal issue. Another library sent title pages to staff when a pertinent item appeared if they would not normally see the journal on circulation. One library merely made one copy of a current contents service and posted this on the information department noticeboard, presumably regarding it as an aid to efficient browsing.

Mechanized information services

The impact of mechanization on the industrial library and information department is especially topical. Yet, despite the news value of mechanized information services, they have not been embraced all that warmly by information departments. Only twenty-one (14 per cent) of the libraries surveyed mentioned mechanized current awareness services.

Some of the computer applications are very simple. For instance, one library has KWIC indexes produced for reports and titles bulletins, and two others have computer-produced reports lists. But these are the exception; most applications exploit the capability of a mechanized system to generate a series of outputs. Aside from the two systems which only generated an abstracts bulletin, all mechanized information systems produced an SDI service; for two this was the only output of the system. The feasibility of providing a large number of users with SDI is seen as one of the key advantages of a mechanized system. Nevertheless, most libraries still felt it necessary to supplement their SDI programme. SDI might be augmented by an abstracts bulletin, a reports list, a titles bulletin or a patents bulletin, all of which might be the products of a mechanized system. But events bulletins and press cuttings bulletins usually remain manual.

Some libraries were enlisting the aid of programme packages, such as ASSASSIN or SLIMPACK, whilst others opted for a locally designed system. Either locally scanned information, and/or the products of external databases, for example UKCIS, BIOSIS, IFIS, may be input.

Perhaps indicative of the fluidity of this situation is the fact that two libraries indicated that they expected to mechanize more of their services in the near future, and a further two were intending to introduce computer-based services. However, the last word should perhaps be left with the librarian who remarked 'all manual—it's quicker'!

Staff time

One measure of the significance of a service is the amount of staff time that an information unit is prepared to dedicate to its current awareness programme. Although this time can be difficult to estimate as it varies from week to week, and may be imperceptibly integrated into other information activities, Table 4 is an interesting summary of trends. Apparently, a worthwhile service can be provided by spending even very little time, but equally, a more ambitious programme requires much more dedication. Patents bulletins vary in the time that they consume, presumably depending on their content, that is, whether they are simply a list of titles, or whether they contain informative abstracts. Events bulletins, usually by-products of scanning for other services, often demand less than four hours a week. Press cuttings bulletins may take a little longer, but rarely more than ten hours a week. Accessions lists, in common sometimes with reports lists, may be by-products of housekeeping routines, and thus generally consume less than four hours a week. SDI may or may not require considerable devotion depending on whether the library runs a major programme, or merely dispatches individual chance items. Abstracts bulletins virtually always demand over ten hours a week, and sometimes very much more. Table 5, which summarizes the total time spent by information units on current awareness activities, reveals a high level of overall commitment.

SERVICE	TIME (Hours)								
	−1	1–2	2–3	3–4	4–10	10–20	20–30	30–40	40+
Patents bulletin	2	4	3	1	1	4	4	2	2
Events bulletin	3	10	4	2	2	1	1		
Abstracts bulletin		1	1		2	17	5	4	3
Current contents	2		2		4	2	1	1	1
SDI		1	6	1	5	1	2		3
Press cuttings service			1		1				
Press cuttings bulletin		8	2		7	3	3	2	
Accessions list	13	14	6	4	7	2			
Titles bulletin	1	2	2		7	1	2		1
Reports list	8	3	1		3	1			1
Combined bulletins		2	2	1	3	6	3	1	6
Others	1	2	1			1			1
TOTAL	30	47	31	9	42	39	21	10	18

TABLE 4: *Staff time expended in man hours per week for each service*

TIME (in man hours)		NO. OF UNITS
-1		1
1-3		10
3-5		7
5-10		17
10-15		15
15-20		7
20-30		18
30-40		10
40+		19
	TOTAL	104

TABLE 5: *Total staff time expended per week on current awareness services (in man hours)*

SERVICE	NUMBER OF COPIES						
	0-9	10-19	20-49	50-99	100-499	500-999	1000
Patents bulletin	4	4	6	6	9		
Events bulletin	2	1	6	4	9	1	
Abstracts bulletin	1	1	5	11	16	3	1
Current contents	2		4	1	5		
SDI	1	2	5	2	5		
Press cuttings service	1				1		
Press cuttings bulletin	7	1	5	1	5	3	1
Accessions list	2	3	4	12	24	1	1
Titles bulletin			3	4	9	1	2
Reports list	2	2	6	2	6		
Combined bulletins		1	4	9	9	3	
Others	2	2	1				1
TOTAL	24	17	49	52	98	12	6

TABLE 6: *Number of copies of publications*

Distribution

How many customers profit from the information staff's work? Which types of current awareness services are distributed to the most readers? Table 6 shows the number of copies in which each publication is issued. Although there are some services which libraries provide for minorities, most publish between fifty and 500 copies. Those services which seem most likely to have a small circulation are patents bulletins and press cutting bulletins.

Frequency of publication

The frequency of a service defines it even further. Only press cuttings bulletins were likely to be issued daily, because the information they contain requires immediate attention. SDI was sometimes viewed as a daily service, since it meets a continuous need. The following list shows that the monthly service was most favoured, irrespective in the main of the type of service:

daily 26
weekly 65
fortnightly 48
monthly 104
monthly-quarterly 14
quarterly 15
quarterly-annually 2
annually 3
irregularly 12

The numbers show the number of services operating at a specified frequency. Presumably most of the information carried by these services can stay fresh for a few weeks.

Indexing language

Respondents were asked to specify an indexing language if one was in use, in part to ascertain whether the service was likely to have any retrospective function. In the event, indexing languages were only given for 121, or 38 per cent, of the services. Most of the remainder were presumably not considered to have any retrospective role. The indexing languages which were cited can be grouped:

classification schemes 16
free language 53
thesaurus 46
subject headings 6

The alphabetical subject approach is clearly important. Many of the thesauri and classification schemes were 'in-house', and the same approach often featured in several services. Several manual services were using free language indexing. Mechanized services were well distributed between those using free language machine indexing and thesaural control or classification codes. In fact, two mechanized services were using a combination of controlled language indexing and free text indexing.

Feedback mechanism

A feedback mechanism is the facility for communication from the user to the librarian. Once the user has received an announcement he can be expected to seek further information. To provide easy access to this information is one function of a feedback channel. Another is to improve the pertinence of the current awareness service by keeping the information officer alert to changing interests. The following feedback channels were cited the given number of times:

request for documents (including loans and photocopies) 140
written communication 15

questionnaire 3
personal contact 35
telephone 15
informal 2
evaluation forms for SDI 3
items marked on list and list returned to library 1
users come to library to read journals 1

(Where a method which overlapped two categories was quoted, *e.g.* telephone request for a document, this has been placed under the heading nearest the top of the list.) Clearly requests for documents is the most important feedback channel. It is surprising how seldom any extra effort is devoted to keeping information flowing. One hundred and sixteen services were specifically mentioned as having no feedback mechanism. Many libraries have feedback for some services but not for others. For example, feedback for events bulletins and manual SDI is rare, largely, I suspect, because there is no associated supplying of documents. Only one information officer remarked that 'we keep records of responses to bulletins and change our subject content in response to user demand'.

Conclusions

Industrial libraries offer an impressive and imaginative range of current awareness services, and virtually all libraries are participating. Different types of service fulfil different needs. Despite the staff time required, local services continue to hold their own against the challenge of commercial services. Similarly, despite its obvious attractions, mechanization has made as yet only very limited inroads.

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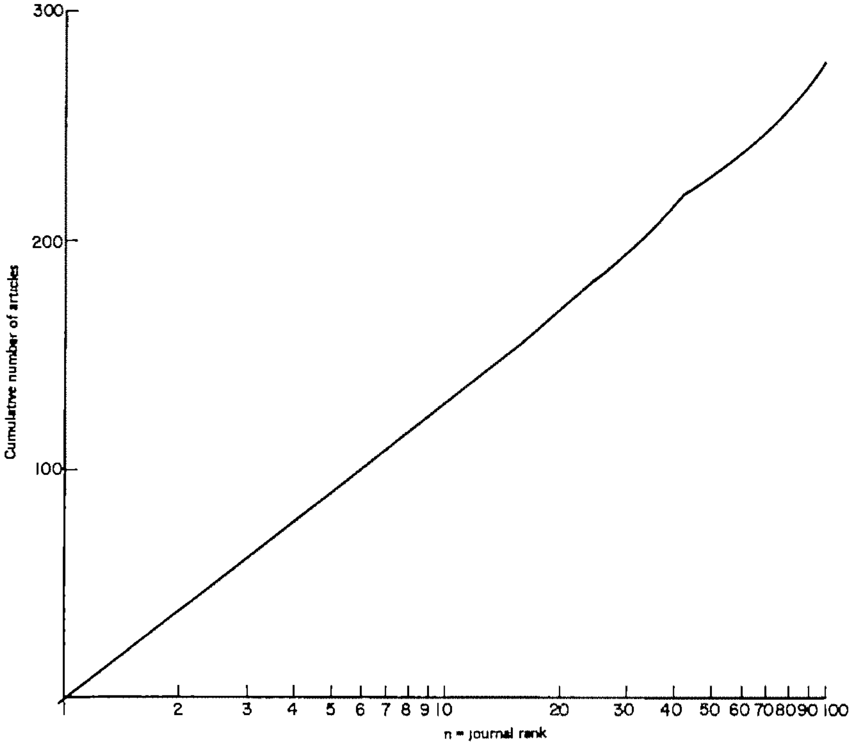
Letter to the editor

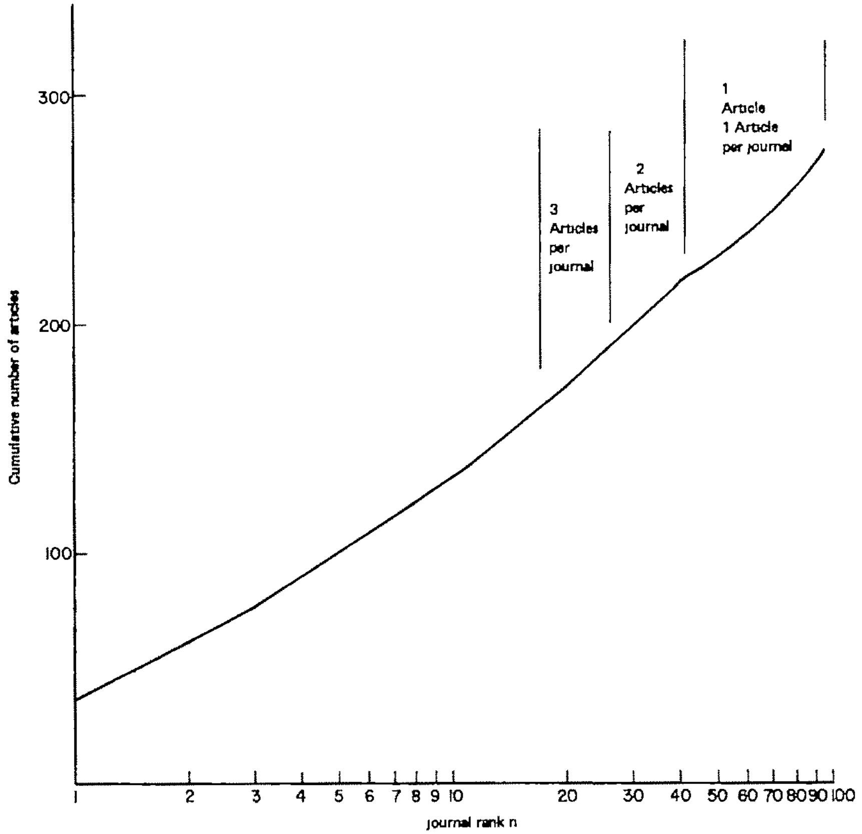
BRADFORD'S LAW

In their paper on Bradford's Law (*Aslib Proceedings*, 31(6), June 1979, p. 296–304) Drott, Mancall and Griffith declare that 'it is generally accepted that the equation representing Bradford's Law does not hold for the most important journals. This exception is minor in overall terms and tends to apply only to the first four or five journal titles' (p. 300).

I would like to point out that if their data are replotted to take into account the fact that log (1) equals zero, then all their experimental points up to journal rank 18 lie on a straight line through the origin ($x = \log 1, y = 0$). This is done by plotting $\log (1+n)$ instead of $\log n$ (Graph 1).



At the other end of their graph the solid curve does not in fact represent their data! There is a cusp at $n = 41$ which is the natural consequence of the change from two articles to one article per journal, and from this point onwards the curve must always increase in slope because each extra journal producing



one extra article must mean a constant increment in the y-direction and a smaller increment in the x-direction than the previous journal produced (because of the log scale) (Graph 2).

R. S. R. HAWKINS
Technical Intelligence & Library,
Plastics Division, ICI Ltd.

ERRATA

Apologies are owed to Michael Haines (Company correspondence: an important information resource, *Aslib Proceedings*, 31(8), August 1979, p. 401–11) and to readers. Several errors in the text should be corrected as follows:

> p. 405: this should be labelled Fig. 2; p. 406: delete '(3.4)'; p. 407: this should be labelled Fig. 1, and 'SECRETARIAL CHANGES' should read 'SECRETARIAL CHARGES'; p. 408: this should be labelled Fig. 3; p. 410: this should be labelled Fig. 4; 'FILE NUMBER' should read 'FILE NAME' (top line); at the bottom 'Date of indexing' and 'Initials of Indexer' should be shifted to the right to sit over their respective string of boxes.

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much disaster as a
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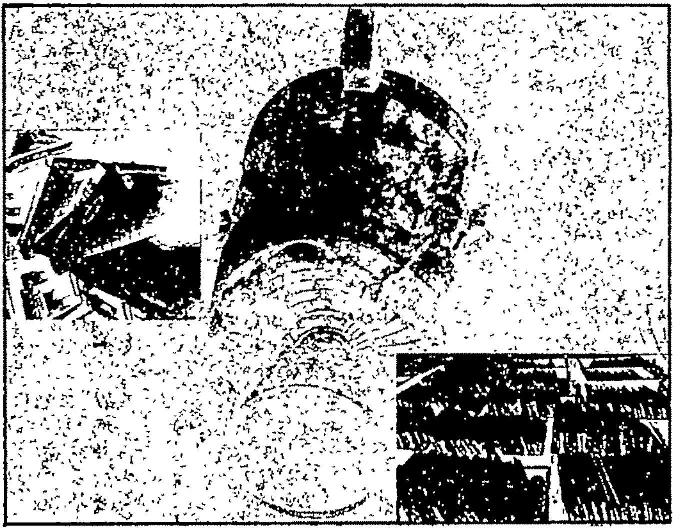
[*James Thurber, Lanterns and Lances, 1961*]



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The Analysis of Meaning

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Librarians and the language barrier

A. J. Dickson

Ealing College of Higher Education

THE ISSUE OF LANGUAGE as a barrier to the work of librarians in post-war Britain was pinpointed in the report of the Royal Society's Scientific Information Conference in 1948.[1] Concerning the work of information officers, it stated:

> Their duties normally include watching literature and doing vicarious reading over a wider range than their more specialized colleagues can compass. . . A knowledge of languages may be an important additional qualification enabling them to save much time for those of their colleagues who are not linguists by telling them the gist of a foreign paper without necessarily making a formal translation.

The issue of translation was also discussed at the same conference:

> Professor F. Norman, Kings College London, said that the University of London has no diploma or similar qualification for translators but that the feasibility of such a scheme has been shown at the Interpreters' School in Germersheim, Palatinate. There was abundant evidence of the advantages of collaboration between translators and technical or scientific specialists.

These links between library/information workers (used interchangeably in this paper) and translators have been greatly elaborated since 1948. A very recent study by Simpson,[2] dealing with curriculum for information science, includes two optional subjects:

> Linguistics, which covers natural and formal languages, linguistic classification, semantics, syntactics and pragmatics; *and*
> Foreign languages—reading and comprehension of foreign languages, preparation of abstracts and reports in English or the language of habitual use, and use of foreign language information sources.

As in 1948, these are 'additional qualifications', 'advantages', options; and the relationship of language study to information work is by no means clearly defined today.

Dubois[3] has surveyed recent changes in the scene:

> Many factors over the last few years have contributed towards increased efforts by information scientists to develop techniques to overcome natural language barriers in the field of scientific and technical information. In particular the development of international and regional networks, the increased availability of acess to large data-bases across national and cultural boundaries, and the financial aid for system development provided by the Commission of the European Communities should be mentioned.

He re-states the argument against English-speakers' concern with the language barrier:

> The evidence shows that English is increasingly the international language for the communication of scientific and technical information; even scientists whose mother tongue is one of the two or three other most widely used languages are under pressure to publish in

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> English. . . . It is therefore not altogether surprising that none of the large United States or British information services have felt the need to provide multilingual output.

But, he argues, there is still a need for techniques for linguistic transformation (such as automatic translation of unprocessed or pre-processed text, automatic multilingual indexing, multilingual thesauri, and an intermediate lexicon or switching language) to be applied to a very great deal of published information at some point. Among others, the European Commission's symposium on the impact of new technologies on publishing in November 1979 must undoubtedly concern itself with these techniques, and with their implementation.

What is the state of the art in the education of librarians to face the language barrier? Language or language-related topics are to be found in the curricula of many American library and information science schools,[4] for instance:

Atlanta—Languages for Science and Technology; Mathematical Linguistics; Advanced Semiotics; Computer Language Design, Philosophy of Language; Syntax-Directed Compilation.
Bethlehem, Pennsylvania—Computers and Language; Descriptive Linguistics; Psycholinguistics, Theory of Formal Grammars; Seminar in Psycholinguistics; Seminar in Semantic Analysis; Special Topics in Linguistics, Retrieval Languages, Mathematical Models in Linguistics.
Brooklyn—The Place of Language in Communication.
Buffalo—Computer Science; Computational Linguistics.
Chicago—Language, Symbolic Process and Computers; Mechanical Translation.
Cleveland—Automatic Language Processing; Linguistics for Information Science.
College Park, Maryland—Construction and Maintenance of Index Languages.
Minneapolis—Introduction to General Linguistics, Mathematical Linguistics; Descriptive Linguistics; Speech and Language in Human Behaviour
Pittsburgh—Linguistics and the Library and Information Sciences; Language Engineering.

General subjects like 'language engineering' and linguistics, versus the study of specific languages, may be the beginning of a trend in library education, as discussed by Walch.[5] However, the need to face foreign languages does not disappear by studying the theory.

But this gives rise to another question: how far are foreign languages used in library science? Walch concluded that:

> . . . even though foreign language proficiency has been required of doctoral candidates in library schools its use as a research tool has not been fully utilized. . . . What information and research from foreign countries will be overlooked because of this deficiency is difficult to determine.

This proficiency affects research activities in library science, but Walch also has strong convictions about the practical applications of linguistics and language training:

> The study of linguistics does not teach the student a particular foreign language but familiarizes him with the various ways in which languages are patterned. With proper guides and a minimum vocabulary list, the student can learn a useful amount of any desired language in a relatively short period of time. With such training the library school graduate could handle the innumerable problems that require only a little language skill and leave for the language specialist those problems requiring oral–aural or reading proficiency. . . . Putting linguistics firmly in the library curriculum would decrease the time for other studies but it would introduce the subject that is more fundamental to librarianship.

'Firmly in the curriculum' contrasts with the optional approach to linguistics and languages referred to earlier.

Conviction of their centrality to information work can be traced in Mills,[6] who says:

> Linguists have developed a number of grammars, of which the most interesting to librarians and documentalists is the transformational or generative grammar pioneered by Noam Chomsky in the 1950s.

There had been two influential articles by Chomsky[7] who described transformational analysis as 'a means for investigating the organization of connected discourse', and Bar-Hillel,[8] who asserted in 1957 that 'not a single first rate logician, linguist or information-theoretician has so far been sufficiently attracted to the problem of information search to spend much of his time on it'. Their challenge has since been taken up, needless to say.

The lasting influence of Mills and Walch can be seen in Anderson's[9] proposed 'library linguistics' course, composed of these elements:

> knowledge and understanding of language in general, multiplicity of languages and writing systems; language-related library problems; knowledge and use of major foreign reference tools.

This course would cover German, French, Russian, Japanese, Spanish, Arabic, Hebrew and Chinese; it would use as a framework the historical development of writing, and emphasize cataloguing and transliteration. (Transliteration itself is perceived as a major problem by Wellisch,[10,11,12] who is 'strongly against the romanization or other conversions of Eastern scripts . . . and the arrogance implied in it'; he recommends a numerical system, like ISBN—'at this level, the librarian must be both bookish and technical'.)

Proposals for overcoming the language barrier have not been solely of American origin; a large amount of influential work has been done in the UK, under the aegis of Aslib and the Library Association. Aslib, for instance, has a record of language-consciousness. The Sputnik year, 1957, saw courses on 'Russian for Scientists' and 1958, a conference devoted to scientific and technical translation. Here Readett[13] described the best combination for a practitioner in this field as 'linguist and specialist'; there was a mention of mechanical translation and the need for a meta-language, possibly Chinese; and the hope was expressed that the specialists would have to be taught linguistics. Stubbs[14] gave a prophetic paper on the dissemination of information about Soviet science, on the eve of Sputnik, and in it expressed the equally prophetic view that 'Chinese with its absence of morphology and its simplicity of sentence construction can be satisfactorily employed as an international medium'.

There was a conference on technical translation in 1960, on the theme of co-operation. Readett[15] outlined the benefits of co-operation and Liebesny[16] gave a short overview of co-operative action abroad, mentioning the European Productivity Agency and foreshadowing the interest taken by the EEC in the same problems. Later, Urquhart[17] returned to the co-operation problem.

1962 might be called the year of the foreign-language barrier, to judge from the two major publications which appeared then. Holmstrom[18] covered the problem of the foreign-language barrier with particular reference to standardization of terminology, and produced an interesting diagram representing all the various languages and their openness to each other, in which Chinese again figures remarkably. Hanson[19] carried out the task set by the 1960 conference when it stressed the 'need for quantitative data on translation problems and investigations'; he compared courses on Russian for scientists, which were felt to be of critical importance because 'significant contributions to knowledge in different countries will be roughly proportional to their populations'.

A few years later, Hutchins' study[20] of Sheffield University library use highlighted another aspect of the language problem:

> It may well be that many university library holdings of foreign language materials reflect a pre-war situation, when the foreign language competence of university teaching staffs was probably greater than it is now.

In his admirable summary[21] two of the ten recommendations are of note:

> improved facilities for research workers . . . in preference to teaching at undergraduate level where motivation is much weaker; university libraries . . . (which) actively promote the use of existing bibliographic tools, information services and translation facilities.

We shall allow Jenkin[22] the last word on the Sheffield study, with his somewhat cynical comment that 'there would need to be a good deal of publicity concerning the introduction of improved language-learning facilities for research workers'.

Liebesny[23,24,25] furthered the interests of Aslib and the Institute of Linguists thus—'We need both linguists who are interested in information work and also scientists and technologists with a knowledge of languages.' He popularized his view of the librarian able to identify and transliterate and leave the full translation to another professional. He forecast the need for languages in CNAA degrees and Institute of Information Scientists qualifications; CNAA degrees in librarianship now often include languages as options, as the following programme description shows:

> Ealing College of Higher Education enjoys an international reputation in language teaching and advantage is taken of this in the School of Library and Information Studies. Classes in German, Spanish and Russian for librarians, are organized for student participation on a voluntary basis and are well supported. Teaching is geared to the specific and realistic objective of encouraging students to be language conscious and to have the capability of handling cataloguing data and bibliographical citation in the language chosen. (*From author's files.*)

The Library Association has been very active, in slightly different spheres. It published Pigott's useful notes[26] on cataloguing, which, together with Ostermann[27] and Piette[28], have helped the librarian in the field. In the field of professional training, Indo-European language and literature, and the librarianship and bibliography of Russian, French and German languages and literatures have featured among LA examination topics. In the early 1960s Dickson[29] tried to instil machine translation, and the 'languages' ALGOL and COBOL, into an FLA option.

Recent Library Association effort has come from the International and Comparative Library Group. Roe[30] showed the growth of international exchanges between library schools, with their implicit language barrier, and pressed for a national collection of foreign library material. An ICLG proposal which outlined foreign library literature received quite a response in the profession.[31,32,33]

The time would appear to be ripe for a close examination of librarians and the language barrier. This present overview of assorted aspects is but prolegomena to such a work. The bases for such examination are identifiable: a concise ten-item bibliography is available from the Library Association Library, and Aslib Library has compiled a 122-item list. Peniston[34] of Aslib Library has, in fact, surveyed the use of foreign-language literature in Manchester.

There are many signs of ever-increasing practical and theoretical recognition of the language barrier. The latest research at Sheffield[35] treats the language barrier historically, and is now concentrating on 'a reinterpretation of Claude Shannon's mathematical theory of communication . . . now known as Variety Generation'. A bilingual cataloguing summer school at McGill University in Canada is now well established.[36] The exhortations of the 50s and 60s to consider Chinese have been realized in Loh,[37] where English and Chinese can be used as computer meta-languages for translation; furthermore, work at Cambridge University[38] on the 'processing of Chinese characters in automated library catalogues' may point to a way out of Wellisch's aversion to romanization, while 'using an intelligent terminal in teaching cataloguing' may make Anderson's ambitious course feasible.

It seems clear that, to overcome the complex of problem areas that have become known as the language barrier, librarianship must extend itself; in the words of Wisbey:[39]

> It is inevitable that the functions of libraries will come to overlap increasingly with the activities we describe as literary and linguistic computing.

Whether librarians of the future are inclined—in divergent terms—to turn from their chimera of cognition of the sense in literature to perception of referential meaning of the signs of various systems with a taxonomy of psychomotor learning objectives, or whether they tread a more convergent path, an understanding of the many aspects of information work that they share with linguists and translators cannot be a bad thing.

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Managing to meet translation needs

Ian F. Finlay

Freelance translator and language consultant

THERE CAN BE few firms in the UK which do not, at least occasionally, need to have some document translated. Articles, letters, patents and, to an increasing extent, telexes are most likely to be involved. There are two main reasons for this need for translations. Firstly, there has been a veritable information explosion during the years following the Second World War, this having affected most fields of human endeavour. Secondly, there has been an increase in the number of languages in which useful information is being produced, largely because of industrialization in many countries which, in the past, made little contribution to technology. This need for translations shows every sign of continuing in spite of the increasing practice in certain countries of producing material in English coupled with the appearance of various cover-to-cover translations of foreign journals into English. The need for translations has obviously also increased within such organizations as the European Economic Community with its six official languages.

Existing translations

There are various ways in which a firm or organization can manage the translation problem. First and foremost is, in the case of appropriate documents such as articles, to ascertain whether a translation already exists which can be borrowed or consulted. It is in this context that Aslib itself can frequently be of assistance by way of the index of translations which it keeps, and which is described in detail in Glover's article elsewhere in this issue.

It is worth mentioning that the Aslib index does not merely list translations prepared or available in the UK. On the other hand, the British Library Lending Division at Boston Spa holds a large number of actual translations and is worth consulting in this context.

Staff translators

Aslib and the British Library Lending Division are only secondary solutions to the translation problem however. There are many organizations and firms which, by their nature, have a high and consistent demand for translations, to the extent that it is economical for them to employ one or more staff translators. The decision as to whether and, if so, when to employ a staff translator is largely an economic one, although there are other obvious advantages in having a staff member to deal, either directly or indirectly, with translations. Salaries paid to staff translators in the UK cover a wide spectrum, partly because various organizations obviously place greater or lesser importance on the service they provide and partly because the salary scale for any post has to allow for progression over the span of a working career. The present range is roughly

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from £4,000 to £10,000 as far as the UK is concerned. To salaries must be added overheads, these varying to some extent with the manner in which the translator produces his/her end-product. An amount between 50 and 75 per cent of salary can, however, be added to cover such items as accommodation, reference works and secretarial and other assistance. Consequently, on purely economic grounds, if an organization finds it is spending much above £5,000 a year on translations, more particularly if commoner languages only are involved, then serious consideration should be given to employing a staff translator. This may sound a high figure, but is by no means so for many firms which spend very much more solely on translations not carried out by their staff translator(s). At current rates it represents about 200,000 words of translated material or, for example, between forty and fifty articles or patents of average length.

Apart from the frequent economic advantage of employing one or more staff translators, there are others. There is a great advantage in having a translator on the spot who can provide oral translations or summaries of articles, this often obviating the need for a full translation and thus reducing costs. A staff translator can also become very much more conversant with an individual firm's products and special jargon than can most translators outside the firm. Finally, there is the confidentiality element which, although exaggerated in some cases, can be important in specific cases. It will also be found that some staff translators can be used as occasional interpreters, although it is important to realize that the skills of translating and interpreting are by no means synonymous and are rarely present to an equal degree in one and the same individual. Staff translators can also possibly be used as general language advisers, if not consultants, within a firm, for example in relation to language training for other employees. This extension of responsibilities beyond translating pure and simple can also, in some cases, entail increasing salaries.

If a firm is employing a staff translator for the first time, the appropriate salary scale and the initial position on it will have to be established, both relatively in relation to the general salary structure within the firm and absolutely in relation to what translators are being paid in comparable firms. Experience, subject knowledge and languages covered will obviously also enter into the salary paid. There is also likely to be an initial outlay for reference works, the extent of which will depend on the subjects and languages involved. If properly chosen, the translator will be a specialist in his own field and should be treated as such. Experience has shown that translators tend to be as good as they are encouraged to be so that it is false economy not to make the best use of them. Much thought should consequently be given to recruiting a translator, and external advice by language consultants obtained if necessary.

If it is found that the volume of work and the languages involved increase, it may well be necessary to consider recruiting a second or even a third staff translator, this being a less drastic step than the initial recruitment of one translator. Some of the larger firms and organizations in the UK have translation departments with between ten and twenty members. In such departments it is possible to allocate translators on a source language and/or subject matter basis, whereas the single staff translator will probably have to be much more versatile on these two levels. It should be pointed out here that no translator, unless truly bilingual, should be asked or expected to translate out of his/her mother tongue. This applies equally to all translators, staff or otherwise.

It is unlikely that the staff translator(s) will be able to cope with all translation requirements within a large firm in relation either to source languages or volume, so that the need will arise, as it will in all cases in a firm having small and/or sporadic translation requirements, to send some material requiring translating outside the firm. Two possible solutions then present themselves.

Freelance translators

Firstly, it is possible to use a panel of freelance translators, in which case the contact between the firm and the translator is a direct one. The nature of translation work is such that it requires specialization at two levels—source language and subject matter. A good style in the mother tongue or target language is also highly desirable as are good presentation of translations and strict adherence to delivery dates coupled, if possible, with a scale of fees which is reasonable in relation to the budget available for freelance translations. Guidance in choosing suitable and reliable freelance translators can be obtained *via* the Aslib Register and the Translators' Guild of the Institute of Linguists although, in all cases, trusted personal recommendation is the best manner of finding a satisfactory translator. It is also important that the allocation of translations to freelances should be in the hands of a person capable of choosing the right translator for a specific assignment. This is more likely to be the staff translator, librarian or information officer rather than a secretary or clerk. Matters relating to translations can be administered in different departments in different firms. Typical examples are the library or information service, the research department (as possibly the largest user of translations) or a general services department. Another matter meriting attention is whether all translations done outside the firm are to be paid for from a general budget or whether the department commissioning a translation should pay for it. It usually matters little what system is adopted providing all concerned are aware of it.

Fees charged by freelance translators vary considerably, ranging, in the case of one specific assignment, from about £10 to £40 per 1,000 words of the original document—this being the normal method of counting and charging used in the UK, apart from such languages as Chinese and Japanese in which case the characters are counted. This state of affairs does not necessarily imply that the translator charging £40 will produce a result four times better than the one charging £10, although it does imply that the former very likely has better facilities for producing his/her translation. Well-equipped freelances have good reference libraries, typewriters with appropriate accents and signs and all the other modern aids required for the production of first-class work. As a general rule, it will be found that most full-time freelances now charge between £15 and £30 per 10,000 words for technical translations into English. Obviously, translations into foreign languages will cost considerably more as will those from certain less common languages such as Hungarian and Turkish. Fees for translations are also much higher in most countries on the continent than they are in Britain.

It should also be remembered that no freelance, however specialized he/she may be, is omniscient and that it is, therefore, wise to provide as much background material and assistance as possible. It will help the translator to help you. Many freelances build up a close and valuable relationship with their clients over the years, and it is one which is very difficult to replace.

Translation agencies

Secondly, it is possible to contract out translation work to an agency or bureau. This solution to the translation problem has the advantage that the choosing of a translator is left to the agency. The best of them will have a large number of translators to draw upon as appropriate, added to which, at least in theory, the translation will be checked before being returned to the client. The better agencies are rightly very scrupulous about this. Agencies can also be the best solution if translations out of English are required or if, as happens in some cases with publicity material, a translation into a number of different languages is required. The best agencies have on their books translators resident in a number of overseas countries who are thoroughly conversant with local conditions. Some of the larger agencies also have facilities for foreign-language printing and can thus handle all aspects of foreign publicity or promotional assignments. It cannot, however, be stressed sufficiently that agencies range from those which are thoroughly professional in every way to those which are little better than highly inefficient post offices! There have been cases in which agencies have sent out as being in Dutch documents which have, in fact, been in Danish, added to which very many are quite incapable of checking work, even if they wished to. Consequently, personal recommendation of a reliable character is of paramount importance if agencies are to be used rather than random choosing from the classified telephone directory, where there seems to be a premium on having a name beginning with the letter A!

Because of overheads, bad debts and the like, the fees charged to clients by agencies tend, almost without exception, to be higher than those charged by freelances. Agency fees will probably be something of the order of a third to a half higher. On the other hand, the agency has the task of allocating the work to the most appropriate practitioner on its books and also, in theory, of checking it to ensure that it is accurate and in every way suitable for its intended purpose. This service can be worth paying for to a firm with only sporadic translation requirements.

Summary

Summarizing the various points made, the following principles can be laid down for solving the translation problem:

1. If the volume of work warrants it, it is best to employ a staff translator, careful consideration being given to recruitment, salary and general conditions of employment.
2. It is generally most satisfactory to build up, on personal recommendation, a panel of freelances to handle work beyond the capabilities, for whatever reason, of the staff translator(s).
3. If there is no linguistic expertise within the firm and if translations into foreign languages are also required, it is probably best to contract out all

translation work to an agency or bureau which has been personally recommended.

If all these principles are followed, there will still, from time to time, be translation problems, as in all other spheres. On the other hand, if they are not followed, the problems are likely to be greater and more frequent!

Tracking down translations

B. J. Birch

Technical Manager, Nemo Heat Treatments Limited

Many scientists encounter foreign-language publications whose subjects are of particular relevance to them. Their problem then lies in finding whether a translation is available and if not, where linguistic help may be found. The most useful sources of information about translations have been surveyed with particular emphasis on their strengths and weaknesses, and with examples pertinent to the metals industry. It has been demonstrated that very little effort is required to be 95 per cent certain of the availability, or otherwise, of a translation of a particular paper.

A RECENT PAPER on 'Information for the Metals Industry'[1] included a section headed 'Translations'. Two-thirds of this section was, in fact, devoted to conference proceedings, whilst the few lines concerning translations indicated that the British Industrial and Scientific International Translation Service (BISITS) and the American Society for Metals (ASM) translations service included practically all metallurgical translations. Although it must be recognized that BISITS and Henry Brutcher translations (the latter available only from ASM) are the two largest sources of *ad hoc* metallurgical translations, they provide only about 50 per cent of these and if cover-to-cover translations are taken into account, their share is somewhat less than 10 per cent. Since it completely ignores other major sources of translations and offers no help in determining whether a particular item has been translated, that author's view is far from reality and serves only to highlight a widespread problem, particularly within industry.

It is possible to argue that, since English is the predominant scientific language, translations are an unnecessary luxury. However, such an argument disregards the fact that some 50 per cent of all scientific publications are in languages other than English and that this proportion is increasing with increasing prosperity and national awareness amongst non-English-speaking communities. Any English-speaking scientist is very naive to believe that he misses nothing if he doesn't bother with references in foreign languages.[2]

The purpose of this paper is not to philosophize upon the translations problem facing scientists, as this has been done elsewhere;[3,4,5] rather, it is to offer practical advice to scientists—with examples drawn from the metals industry, based on the author's experience—on dealing with references in foreign languages.

Sources of translations

Unfortunately, but perhaps not unexpectedly, there is a wide variety of sources, both of translations and of information regarding their availability. For the sake of simplicity, the sources have been classified according to their primary coverage:

1 cover-to-cover translations;
2 individual translations;

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3 translations into more accessible languages;
4 translations of books.

1 Cover to cover translations

The most obvious solution to the language problem is the complete (cover-to-cover) translation of foreign language journals. However, this is also the most expensive solution and accordingly, the number of journals available in this form is severely restricted. For example, the British Library Lending Division (BLLD), which attempts to subscribe to all journals in the fields of science, technology and social science, quotes its current serial intake as 48,750 titles and its non-current holding at about 72,000 titles,[6] whilst the total number of entries in *Translations Journals*[7] is 1,173, of which perhaps half will be cover-to-cover translations. It is evident, therefore, that no more than ½ per cent of all journals are, or have been, available as cover-to-cover translations. (This, of course, includes cover-to-cover translations into all languages, not only English.) In spite of the relatively small number of cover-to-cover journals available, they are a very valuable source of translations by virtue of the fact that only the most important and widely quoted journals could attract enough subscribers to become financially viable.

In an attempt to overcome the difficulty of financial viability there is a growing tendency towards the production of 'selective' translations journals. These generally consist of the most important articles chosen from two or more journals and published together. An example of this type of journal is *Steel in the USSR* which contains selected articles from *Stal'* and *Izvestiya V.U.Z. Chernaya Metallurgiya*. As a point of interest, both of these Russian journals are completely translated and those papers which are not included in *Steel in the USSR* are available from the publishers' translation services as individual translations.

Most cover-to-cover translations were begun in the period 1955–65 although there are a few earlier ones and new titles appear from time to time. There are numerous published guides to cover-to-cover translations,[8] but only the more important and widely available ones will be considered here.

A Guide to the Scientific and Technical Journals in Translation by Himmelsbach and Brociner[9] is the most widely available of these guides. Published in the USA by the Special Libraries Association, the second edition of 1972 is the most recent. As might be expected, considering the publisher, this book is very thorough and gives much more detail than would normally be required by the casual user. Practically all of the journals included have been examined and compared with the original so that not only have the authors given the usual translation start date (and finish date where applicable) and publisher of the cover-to-cover journal but they have also included extent of coverage, title changes, presence or otherwise of indexes and tables of contents, time lag between the appearance of the original and the translation, and other bibliographic data, mainly of use to librarians. The list of journals is divided into two parts; the first deals with cover-to-cover translations whilst the second consists of those journals which are not true cover-to-cover translations but, for instance, selective translations. Both sections are in alphabetical order under the title of the original journal, the English language title being given in brackets. Two indexes are included, one to the English language titles and the other to frequently encountered Russian abbreviations for journals. The latter index is particularly useful because of the Russian habit of using acronyms (such as *MiTOM* for *Metallovedenie i Termicheskaya Obrabotka Metallov*) as abbreviations in their references.

The most comprehensive guide to cover-to-cover translations is *Translations Journals* 1974/75—*Annex to the World Index*, published by the European Translations Centre.[10] Originally included in the annual cumulative issue of the *World Index to Scientific Translations*, it grew to such proportions that it was issued as a separate, pocket-sized book in 1974. Although the format of *Translations Journals* is alphabetical under the title of the original journal, with an index covering both the original and English-language titles, it is important to use the index first and not merely refer straight to the bibliographic section, since the latter does not contain any cross-references. Thus, *Izvestiya V.U.Z. Chernaya Metallurgiya* appears only under *Stal'* in the bibliographic section whilst *Stal'* is to be found not only under its own title but also under *Soviet Metal Technology*, a selective translation journal. It should be noted, however, that there is an 'Additions' section in this book which is not covered by the index. As well as listing published cover-to-cover and selective translations journals, various unpublished cover-to-cover translations and abridged translations series are included.

The most recent major guide to cover-to-cover translations is *Journals in Translation*,[11] published by the British Library Lending Division (BLLD). Covering only published journals, the bibliographic section is in alphabetical order according to the title of the original journal. A novel feature of the bibliographic details is the inclusion of the BLLD shelfmark for each journal which should facilitate borrowing the items from the BLLD on inter-library loan. Over one-third of *Journals in Translation* is devoted to a KWIC index to the English-language titles, providing a fully cross-referenced subject index to the journals.

The BLLD and the International Translations Centre (formerly the European Translations Centre) have collaborated on a new edition of *Journals in Translation*, published in October 1978. It was intended that this edition should supersede the earlier publications of both organizations but since its selling price is £18 (compared with £2 for the first edition and £5 for *Translations Journals*) it is doubtful that it will achieve the wide circulation of its forebears. Comparison with the earlier volumes shows its main cost increase to be due to its hard-cover binding since although it has almost twice as many entries (982) as its first edition (517) it contains fewer entries than *Journals in Translation* (1,173). As in the first edition it contains a keyword subject index which is very helpful and now much expanded. Several appendices are provided which usefully expand on the involved translations problems of patents and several of the more complicated journals such as *Doklady A. N. SSSR*.

One final guide to cover-to-cover translations worthy of note; *Holdings of Translated Journals*[12] is included here mainly because it is obtainable free of charge from: Publications, British Library Science Reference Library, Bayswater Branch, 10 Porchester Gardens, Queensway, London, W2 4DE. The Science Reference Library (SRL) is the most helpful public access library with respect to translations (of which more details later). *Holdings of Translated Journals* is quite simply a list of the 300 or so cover-to-cover journals held by SRL. Although its contents should be covered by the other guides, it is easy to obtain and very useful for quick references if the other guides are not readily available.

2 Individual translations

There are a great many guides to individual translations. Chillag, in his extremely useful review,[13] included a table showing thirty-one published guides, yet his list was by no means complete when published in 1971 and is now rather dated. The only recent guide to such guides is *Translations (a general guide to their availability)* published by the Science Reference Library in 1976.[14] This publication is disappointingly poor both in the quality and quantity of information it provides and is really not worthwhile. A measure of its shortcomings is its failure to mention the largest translations index in the UK, held by the BLLD, an amazing omission in view of the fact that SRL and BLLD are both part of the British Library.

Most guides to translations restrict their coverage either to translations done for (or held by) a particular organization, for example, *USAEC Translations List*, or within a particular subject area, for example, *Bibliography of Medical Translations*. Very few organizations have the incentive or resources to attempt to list all translations. Undertakings of such magnitude are generally restricted to major national centres such as the Deutsche Akademie der Wissenschaften (East Germany), Centre National de la Récherche Scientifique (France) and the National Translations Center (USA).

The following sources of information about individual translations into English are restricted to what might be termed secondary sources, which tend to hold or list translations rather than produce them, the one exception being BISITS. In practice, the majority of translations openly available eventually find their way to these secondary sources.

The National Translations Centre

The publications of the National Translations Center (NTC) contain the most extensive listing of translations in the fields of science, technology and the social sciences, irrespective of whether NTC holds the translations or not. The origin and deveolpment of the NTC and its publications are amply dealt with by Chillag.[15] In 1967, NTC commenced publication of *Translations Register—Index* (*TRI*), which lists all translations received or noted by NTC. To cover those translations carried out before 1967, NTC published the *Consolidated Index of Translations into English* (*CITE*)[16] in 1969. Essentially, *CITE* cumulates the translations listed in most of the earlier publications—once again, the full details are given by Chillag.[17]

Although *CITE* covered only journals and patents, *TRI* also included conference papers and books in two separate sections at the end, although these were dropped in 1973. The journals sections of both publications do, however, include standards and some technical reports series. Arrangement of the journals section is alphabetical and then chronological under each title. A reference number and code leads the user to the source of the translation.

CITE and *TRI* have a few idiosyncrasies which it is well to bear in mind when using them:

—Transliteration: The USA uses a slightly different transliteration scheme to the UK but such differences as there are usually easy to spot and cause little trouble. However, certain non-English letters, a, ó, etc., may cause confusion when transliteration results in a change in the alphabetical order of the title. For example, *Härterei-Technische Mitteilungen* is found under *Haerterei-Technische Mitteilungen* and some five to ten titles appear between Haerterei and Harterei.

—Titles: Generally, the full title of the journal, as found on the original title-page, is used and arrangement is in alphabetical order omitting words like 'the', 'for', 'of', etc., for example, *Zeitschrift fuer Chemie* comes before *Zeitschrift des Vereins Deutscher Ingenieure.* Also, titles beginning with an abbreviation come at the start of each letter section, for example, *MTZ* comes before titles beginning *Ma*. . . .

—Title changes: Journals whose titles have changed always pose a problem. Occasionally, cross-references are used in the text, to guide the user to the listing, but no fixed rule seems to apply as to whether the listing should be under the old title (*Zeitschrift des Vereins Deutscher Ingenieure* rather than *VDI–Z*) or the new title (*Metallovedenie i Termicheskaya Obrabotka Metallov* rather than *Metallovedenie i Obrabotka Metallov*, from volume 6 of *TRI*). However, the problem is compounded in retrospective searches when lists may be found under both old and new titles. (For the latter example, both titles are listed in *TRI* volumes 1 to 5.)

—Bibliographic details: Since the sources of translations differ widely, so do the bibliographic details given by the translators. Some translators give as full a reference as possible whilst others give the bare minimum, often omitting the volume or issue number or both. As *CITE* and *TRI* lists are computer generated with only minimal editing, separate lists can be produced within each particular year depending upon the bibliographic information given. Thus when searching for a particular translation, it is important to check all entries for the year in question rather than rely on just checking entries with the same issue or volume number.

Aslib

Aslib maintains a significant index, which is described in the article by Glover elsewhere in this issue.

The British Library Lending Division Translation Section

In the late 1950's the Lending Library Unit, as the BLLD was then known, began collecting individual translations. The origin and development of BLLD's translations interest have been amply dealt with by Chillag, a member of BLLD's Translations Section, in his review.[18] Currently, BLLD's stock includes over 400,000 individual translations which are listed in a card index. Although the index is essentially a listing of BLLD's holdings, it does contain a number of entries for translations which are only available from other sources. BLLD will answer enquiries about the availability of translations made either by letter or through the normal inter-library loan channels. Although a delay of two to three weeks in replying can be expected, BLLD will have checked with Aslib all items for which it cannot locate a translation.

The Science Reference Library

The SRL which is also part of the British Library has its own card index of translations. It differs from the Aslib and BLLD indexes in that it is solely devoted to translations held by SRL and is available for public use. Two copies of the index are maintained, one at the Holborn Branch and the other at the Bayswater Branch. As well as listing the individual translations, obtained by SRL from various firms and organizations, an attempt is also made to list published translations. This latter effort is particularly notable since no other translations index includes published translations. A list of the sources of SRL's translations has been published as *Aids to Readers No.* 19.[19]

Although the index is in the usual alphabetical order according to journal title, it does have its own peculiarities. For example, *Comptes Rendus des Séances de l'Académie des Sciences* is to be found under 'Académie des Sciences'. In consequence, if no entry is found for a particular journal, the main periodical catalogue should be consulted since it contains appropriate cross-references.

For those who can't get to SRL to use the index themselves, enquiries may be made to the Holborn Branch; telex 266959; telephone 01-405 8721.

British Industrial and Scientific International Translation Service

Originally called the 'British Iron and Steel Industry Translation Service', its present title was derived from the original acronym BISITS when its parent body, the Iron and Steel Institute, merged with the Institute of Metals to become the Metals Society. BISITS is run on a co-operative basis by the Metals Society and includes translations in the ferrous and non-ferrous fields as well as those related to metallurgy in general. Although BISITS does carry out translations, the majority of its translations come from co-operating firms who donate translations they have made in return for credit vouchers, redeemable against BISITS translations.

Apart from the translations it receives from industry BISITS also disseminates translations produced by the Metals Society in its role as representative of British metallurgical interests on international committees. For example, the Metals Society is a member of the Association Européene pour l'Echange de la Littérature Technique dans la Domaine de la Sidérurgie (ASELT) which provides subsidies for translations of iron and steel literature into Common Market languages.[20] In 1976 the Metals Society produced about 700 translations under the auspices of ASELT, the translations being made available to non-ASELT members through BISITS.

All BISITS translations are noted by both Aslib and BLLD and, in future, will be listed in *ASM Translations Index*. Although BISITS will answer enquiries by letter (BISITS, The Metals Society, 1 Carlton House Terrace, London, SW1Y 5DB) or telephone (01-839-4071), enquiries should be restricted to items published in the preceding twelve to eighteen months since Aslib and BLLD will have index entries for earlier items. If it is intended that a translation be made BISITS should be notified, on a special form that they will supply, to prevent duplication of effort.

The American Society for Metals Translation Service

The American Society for Metals (ASM) is the most recent (1975) major entrant into the translations field. Although ASM does not appear to prepare translations itself, it is the sole source of Henry Brutcher's translations (since his recent retirement) and is the US agent for translations from BISITS, V. E. Riecansky, The Steel Castings Research and Trade Association (SCRATA) and World Aluminium Abstracts.

ASM's venture is really a marketing enterprise and to publicize its holdings *ASM Translations Index* has been published quarterly since February 1977. Issues of *ASM Translations Index* are cumulative so that a one-location, up-to-date list is always available. Each issue is divided into two sections, a source index and an author index. The source index lists articles from journals under the journal title, patents and standards under the issuing country, conference papers under the official name of the conference and pamphlets and reports under the name of the issuing body. Since the journal is computer generated, it is somewhat surprising to find that entries in the index are not all in date order and that journal titles are not consistent. Thus, to check an article from a popular journal such as *Archiv für das Eisenhuttenwesen* one must scan more than six columns of entries (164 individual translations) and two title abbreviations. The foreword explains the variation in title abbreviations as being due to the multiple source input but I feel that one could be forgiven for expecting the publisher of *Metals Abstracts* to have at least journal titles under control. Each entry includes the title, price and translation reference number as well as the usual bibliographic details. The author index also includes the title price and translation reference number but omits the bibliographic details. As there is, therefore, no cross-reference between the two indexes, there could be some minor problems in its use.

With the exception of World Aluminium Abstracts translations, all of the other current series included in *ASM Translations Index* originate in the UK and should, therefore, be listed in the major British translations indexes. The journal is available in the UK from Mr M. L. Pearl, The Metals Society, 1 Carlton House Terrace, London, SW1Y 5DB.

Published translations

With one exception (SRL), all of the sources of individual translations mentioned have concerned themselves only with translations carried out for the use of an individual or organization. In addition to these, many articles are translated each year with a view to republication in English-language journals. Also, articles written by personnel from multi-national companies are often translated and published in many of the countries in which the companies operate, as an adjunct to their advertising effort.

SRL's translation index is the only one which deliberately attempts to include published translations. To this end, a number of journals which regularly include translations amonst their articles are scanned and items noted are entered in SRL's card index.[21] A list of these publications is to be found in *Aids to Readers No.* 19.[22]

The other source of information about published translations is obviously abstracting and indexing periodicals. *Metal Abstracts* and *Engineering Index* are the most important for general coverage of the metallurgical and closely related fields although for pre-1973 material related to iron and steel the cumulative indexes to the publications of the Iron and Steel Institute are also invaluable. There are, however, many abstracting and indexing publications devoted to restricted subject fields, often containing much of interest to metallurgists, which offer far more detailed coverage than the general publications. A full list of abstracting and indexing journals, arranged in subject order, is available[23] and should enable individuals to determine which publications are most relevant to their needs.

3 Translations into more accessible languages

In 1960 the Organization for Economic Co-operation and Development initiated a co-operative translations scheme amongst a number of, mainly European, countries. A year later, as a result of this initiative, the European Translations Centre (ETC) was formed at Delft in The Netherlands.[24] The object of the scheme was to have a central clearing house for translations from non-western languages, chiefly Russian and Slavic languages, Finnish, Hungarian Chinese and Japanese, into Western languages.

To publicize their efforts, ETC published (in English) a *List of Translations Notified to ETC*, which gave full bibliographic details, and *World Index of Scientific Translations*, which was a quarterly index to the *List*, with an annual cumulation. In fact, there were six volumes of the *List of Translations Notified to ETC* from 1966–71 and five companion volumes of *World Index of Scientific Translations* from 1967–71. These publications should be used together as the latter is simply an index to the former. From 1972, the two publications were combined as *World Index of Scientific Translations and List of Translations Notified to ETC* and numbered volume 6. In January 1978 the latter was merged with *Transatom Bulletin*[25] and *Bulletin des Traductions*[26] under the title *World Transindex*. It cannot be stressed too strongly that the annual cumulation of this publication cumulates the index only; the other eleven issues must not be discarded as they contain the bibliographic information.

The bibliographic citations in the last section are grouped within general subject fields according to the now defunct US Committee on Scientific and Technical Information (COSATI) subject headings. (A full list of these headings is included in each issue.) Titles in the index section are arranged in alphabetical order of the original periodicals followed by year, volume, issue, pages and reference number which is a cross-reference to the bibliographic section.

When ETC was formed, the UK was a full member, represented by the BLLD (then NLL). Experience soon showed that ETC was of only marginal use to the UK and BLLD withdrew their membership. There is very little chance of finding an English language translation in ETC publications which is not in either the BLLD, Aslib or NTC indexes. The use of ETC is, therefore, restricted to those who speak other western languages or have ready access to translators.

4 Translations of books

Translated books are relatively easy to locate since the majority have been translated with a view to publication and comprehensive author and subject indexes to published books are readily available.

There are two major compilations of currently available books which are published every year or so. Books published in USA are listed in *Books in print* published by Bowker whilst those published in the UK are to be found in *British books in print* published by Whitaker. Most major bookshops in the UK should have a copy of *British books in print* or, better still, the microfiche version, which is updated monthly.

Books no longer in print should be listed in the appropriate national bibliography: *British National Bibliography*, published by the British Library or *National Union Catalogue*, published by the American Library of Congress.

Index Translationum, which has been published by UNESCO since 1949, is a list of translations, into all languages and in all subject areas, published throughout the world. As well as listing English translations published in USA and the UK, which should in any case be in the previously mentioned book indexes, it will also include English translations published in other English-speaking countries and also in those countries where English is an accepted scientific language if not the everyday language (India).

Linguistic help

If all of the above sources of information fail and there is no translation available then there are several possibilities for extracting the required information from the foreign-language item.

Firstly, check the item in as many abstracting periodicals as possible. In general a number of people with different depths of knowledge in the subject in question will have prepared the abstracts for each periodical and some abstracts may be much more informative than others. If this merely serves to whet the appetite further, linguistic help is available from SRL. Generally speaking, a member of SRL's staff, experienced in the appropriate language, will provide assistance either at SRL or by telephone but full details of this service are given in SRL's *Aids to Readers No.* 11.[27]

In the event that a full translation is required quickly, the names and addresses of translators may be obtained either from local university and college libraries or from Aslib,[28] and BISITS will provide a quotation for a custom translation.

If there is no urgency over the translation then BLLD operates a custom translations scheme (taking eight to ten weeks) whereby they carry out translations and charge the requestor only a proportion of the cost provided he will edit the translation. Full details of this scheme can be obtained from the BLLD Translations Section.

It is a matter of common sense that a copy of every translation should be filed somewhere for permanent reference. For each suitable translation donated to

BISITS, two 'credit vouchers' are sent. Each of the vouchers can be exchanged for any BISITS translation irrespective of price. A copy of those translations not appropriate to BISITS should be deposited with the BLLD. For those intending to have translations made, or indeed to do the translating, there is the *Specification for the presentation of translations*,[29] published by British Standards Institution, which contains much helpful information to ensure that the maximum benefit is obtained from the translation.

Current awareness services for translations

A great many specialized societies keep abreast of publications relevant to their field of interest, often noting translations as a matter of course, and these subsequently find their way into the published literature. For example, in their quarterly journal *Heat Treatment of Metals*, the Wolfson Heat Treatment Centre publish a list of translations relevant to heat treatment, culled from a great many sources. Such efforts obviate the necessity of obtaining and scanning those sources used by the societies and, generally, societies will pick up new translation services far more readily than would an individual.

If there is no published compilation of translations in the desired subject area then it is possible to obtain lists of translations from many commercial (BISITS, V. E. Riecansky, Technicopy, etc.) and non-commercial (SCRATA, Health and Safety Executive, etc.) translations services although, to be fair, they do expect those who receive their lists to purchase translations occasionally. The translations services listed in brackets are given as examples only; there are a great many others, often unexpected (for example, British Gas often carry out translations relating to the heat treatment of metals) which contain translations relevant to metallurgists. Fortunately, the journal *BLLD Announcement Bulletin* published monthly by the BLLD lists the majority of translations carried out in the UK. Its major drawback is, however, that it only includes translations received by the BLLD and this can often mean a delay of twelve months or more between the translation being available and its appearance in the *Bulletin*. In addition to translations, *BLLD Announcement Bulletin* also notes theses and reports received by the BLLD and is often the only source of information about this unpublished literature. There are plans to replace *BLLD Announcement Bulletin* with a new and more comprehensive publication in the near future, possibly with author and subject indexes.

Finale

It is important not to confuse theory with fact. BLLD will have an index card for each translation they hold and will, in theory, indicate this every time an enquiry is made about a translation they hold—they don't! In theory BISITS will have details of every translation they have done—they haven't! In both of these cases, theory breaks down in the face of human error. To put it bluntly, no single source is as perfect as it thinks (or claims) it is, so try as many different sources as possible.

To illustrate this I recently took 276 journal articles (on nitriding) in ten languages (mostly Russian, German and French) and having removed the ninety-four cover-to-cover translations I checked the rest in all of the major sources with the following results:

Aslib—52 translations:
  Eleven not noted by BLLD although they held at least two of them; 7 sole references (*i.e.* translations not noted by any other service).
BLLD—50 translations:
  Nine not noted by Aslib; 2 sole references.
NTC (*CITE* & *TRI*)—39 translations:
  5 sole references.
ETC—11 translations:
  All English translations were noted by other services but I located 2 translations into German and 1 into Italian.
SRL—2 translations:
  Both abridged and published; 1 sole reference.

It is evident from this simple analysis that, excluding cover-to-cover translations, some 80 to 90 per cent of available translations will be found by BLLD (who automatically check items they can't find with Aslib) and over 95 per cent will be found if *CITE* and *TRI* are checked also.

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24 Description of the joint European–American translation network for non-Western scientific and technical literature. *World Index of Scientific Translations*, 1967, 1, cumulative issue, p. v–viii.

25 *Transatom Bulletin.* Directorate General for Scientific and Technical Information Management of the Commission of the European Communities, Luxembourg.

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The training of translators

Catriona Picken

Head of Foreign Language Services, Shell UK
Administrative Services

'IF YOU HAVE a degree in modern languages, you can translate. If you can translate, you can translate into a foreign language just as easily as you can translate from that language into your mother tongue. If you are a translator, you can also act as an interpreter.' Most technical translators will agree that these are three of the most commonly held misconceptions about translation and translators.

To take the first fallacy, a degree in modern languages can be one for which students undertake an in-depth study of the literature of a certain foreign country or countries; they can emerge with good degrees without ever having set foot in the country, without knowing anything about its history and present-day conditions (except as reflected in the literature), and without being able to conduct a simple conversation. Translators may have acquired this kind of degree, but for them it is normally only the prelude to a specialized study of translation techniques, at, for example, the Polytechnic of Central London; or, as is the case more and more often nowadays, translators may bypass the traditional degree altogether and go straight to a university or polytechnic offering a non-traditional course, such as Bradford or Salford. After such a course, they know that what they need next is experience.

The second fallacy results from the notion commonly held by non-linguists that it is just as easy to translate into a foreign language as it is to translate from it. I have already indicated that just the one skill of translating from a foreign language into one's native tongue requires extensive training and experience. Translating into another language is usually time-consuming and can never reach the standard of work produced by a trained person translating into his or her own language.

The third fallacy is that all translators can interpret. Some can, but I find that it is rare to find translators who enjoy interpreting and do it satisfactorily (and *vice versa*). Having said this, I have met people who perform well as both, but they are far outnumbered by those who have a definite preference for and ability in one, but not both, of these skills.

Linguists embarking on a translating career, therefore, will expect to spend most of their time translating texts from one or more foreign languages into English. With the facilities now available for formal training, it is rare for someone to come straight from a conventional degree course into translation, especially technical translation, but even with specialized training most translators expect to learn on the job. Some gain experience as freelances or by acting as sole staff translator, but many join one of the large or small translation teams in industry, commerce or government, either in the UK or abroad.

The various universities and polytechnics offering language courses aimed at producing practical linguists all tailor their syllabuses to the requirements of the

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potential employers of their students. An example of this is Bath University, which concentrates on the kind of interpreting and translating to be found in the various international organizations. On the other hand, the Polytechnic of Central London's postgraduate diploma in technical and specialized translation attracts students who are not keen on interpreting but who are interested in studying technical translation in greater depth than is possible elsewhere.

Students completing these courses look round for an appropriate outlet for their skills, and if they join a translation team, they will naturally benefit from the experience of their colleagues. The ones who go in for freelancing or who find a job in which they are working on their own have in my opinion a much harder task.

The on-the-job training which I know best is the kind practised in the Division of Foreign Language Services at Shell UK Administrative Services where I work. New translators learn by actually translating and having their work checked by an experienced translator. This checking is always done face to face and is not the more common system of 'revision' where the reviser works alone. Aspects of grammar and style are discussed as they arise and technical points are elucidated at the same time. In our Division we take the line that what we provide is expert knowledge of language and translation. We realize we cannot hope to compete with the depth and breadth of subject knowledge of someone working in a particular technical field. All the same, by means of short training courses or specially arranged seminars in subjects such as basic chemistry, elementary computing, the rudiments of accounting and so on, new translators are at least acquainted with some of the vocabulary and concepts in these fields.

The training of translators, unlike the training of linguists, requires that particular attention should be paid to English as well as the foreign language(s). After all, however well people may know, for instance, French or Danish, as translators they are virtually useless if they cannot render these languages into good English, as far as possible matching the style of the translation to that of the original text. Good English style is very important. However, my years of experience have taught me that this is one aspect of a translator's work where training has only a limited effect. By exhortation and advice, one can eliminate actual errors, demonstrate how to avoid a painfully literal interpretation, and where necessary teach translators a 'house style' but, in my opinion at least, the ability to produce a truly felicitous phrase is something innate.

The majority of translators will have spent some time in one or more of the countries whose language they have studied, usually as a part of their course, and for a period of at least six months, but return visits are a very important aspect of training. No amount of reading foreign newspapers and magazines, of listening to radio broadcasts, of attending conversation classes, can equate to the effect of spending a week or two, and preferably more, in the foreign country concerned. Contact with a recently arrived native speaker can be of help in solving problems of up-to-date idiom and terminology, but a visit abroad is best, and ideally this should be a proper study visit and not just a holiday.

Readers who are interested in a more detailed, factual survey of the training of translators should consult Chapter II, 'The Training of Translators' in the Aslib publication *Technical Translator's Manual* (London, Aslib, 1971; J. B. Sykes, *ed.*).

The work of the translator: four case studies

Edited by Catriona Picken

Head of Foreign Language Services, Shell UK
Administrative Services

THESE CASE STUDIES reflect the wide range of activities of people who are all labelled 'translator'. Three of the writers, John Alvey, John Craddock and Albin Tybulewicz, are members of the Committee of Aslib's Technical Translation Group. The fourth, Douglas Embleton, is a Group member but less able to participate actively because he is based some considerable distance from London.

Readers will at once see that despite the diversity of translators covered by these case studies, there are some categories which are missing, mainly the international organizations. However, anyone who is particularly interested in the work of translators at the United Nations would do well to track down the Summer 1979 number of the *Newsletter* of the Translators' Guild of the Institute of Linguists, which contains a most useful contribution from Patricia Lecomte du Nouÿ. Both Aslib and the Institute of Linguists (24A Highbury Grove, London N5 2EA, telephone 01-359 7445) hold copies of the *Newsletter*. It is planned to include a similar article on the work of EEC translators in a forthcoming issue of the *Newsletter*.

The common thread running through all the case studies included here is that the translators who are describing their work clearly find that it is enjoyable and stimulating. Accurate, well-produced translations, supplied in the time required, not only satisfy customers but give translators the feeling that they are doing vital work which constantly provides them with challenge and surprise. Translators, it seems, are always learning and are happy to be doing so.

The translator in the Civil Service

John Alvey, Chief Translator, Departments of the Environment and Transport

For various historical and administrative reasons the role and status of translators vary considerably in different Government Departments. Only a few departments—Environment and Transport, Agriculture, Industry (including Trade and Energy), Health and Social Security and the Metropolitan Police Office—employ staff in Translator grades. There are three grades within the Translator class—Translators I, II and III—analogous to the administrative grades of Senior Executive Officer, Higher Executive Officer and Executive Officer respectively.

Most of the other major departments have translating staff but usually under another name. In the Ministry of Defence most of the translation work is done by Linguist Officers, who are also linked to the administrative grades but go up

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two grades higher. The Joint Technical Language Service employs Linguist Specialists, the Central Office of Information employs Information Officers, Inland Revenue, Customs and Excise and the Foreign Office employ ordinary administrative grades, the Property Services Agency employs a librarian and the Transport and Road Research Laboratory and Health and Safety Executive employs Scientific Officers—all of these doing translation work. Because of these anomalies the Civil Service Department, in conjunction with the relevant unions, is now examining the whole position of translators and it is hoped that a more uniform structure will be the result.

The normal career of a translator in the Translator class starts with an advertisement in one of the quality newspapers. Recruitment is conducted by the Civil Service Commission and each advertisement normally attracts in excess of 100 replies. About one-third of these are weeded out as not meeting the basic requirements. These requirements are a knowledge of two specified languages (usually French and German but requirements vary from Department to Department), at least one of which must be to good honours degree or equivalent standard, and English mother tongue. The remaining two-thirds are invited to sit an exam in their two languages and the twenty or so most successful ones are then called to a Civil Service Commission Board which will normally include at least one representative of the employing Department. At the Board the candidate will be examined for knowledge of other languages, ability to cope with scientific and technical material, ability to work in a team, commitment to being a translator and commitment to holding a job for a period of time.

The work of the successful candidate will vary according to the Department to which he is appointed. Of the five Departments employing Translator grades one has a large section (twenty-one translators), two medium-sized (five to six) and two small (one). In the large unit (Industry) he will be allocated to a team under the supervision of a Translator II who will check all his work. In the medium-sized sections his work will also be checked by a Translator II but he will be expected to do anything and everything in his languages that the Section is called upon to deal with, while in the small sections (Metropolitan Police, Health and Social Security) he will be involved in everything and be expected to be a polyglot and a polymath!

What type of material is a translator expected to translate? Within a central Government Department this will include correspondence, usually between UK civil servants and officials of foreign governments; working papers of international bodies (usually smaller ones that do not have their own translation units—there is very little work emanating directly from the EEC); technical articles on a wide variety of subjects; statistics; reports prepared by foreign or international organizations; forms; foreign legislation, etc. The subject matter is usually very wide—much wider than the name of the Department might suggest. In the Departments of the Environment and Transport, as well as the obvious subjects, we cover such subjects as endangered species, ancient monuments, civil engineering, structural engineering, housing, planning, fire safety, carriage of dangerous goods, hydraulics, sport and gypsies!

In the central Government Departments apart from Defence, French and German are the main languages but otherwise it varies from Department to

Department. In our case Russian and Dutch vie for third and fourth place though, apart from Defence, most departments have little Russian. The other two EEC languages—Italian and Danish—hold fifth and sixth places. Other languages we have 'done' include all the European national languages except Icelandic and Albanian plus Arabic, Farsi, Japanese, Chinese, Indonesian, Amharic, Hebrew, Gujarati, Punjabi, Bengali, Welsh, Turkish, Urdu, Ukrainian and Cornish.

The freelance translator

John Craddock

A newspaper article appeared recently on the experimental teaching of German to schizophrenic psychiatric patients who, it was stated, are frightened by reality and therefore talk in metaphors, which may be incomprehensible to another person. The patients were able to leave behind the emotion-loaded world of their mother tongue through this learning of another language—which, being more neutral, apparently acted like a tranquillizer. They then resumed their mother tongue, speaking it more coherently, and were, therefore, accessible to psychotherapy.

There seems to be an indication in the article that bilingual activity such as translating is a mildly schizophrenic (and at the same time, therapeutic) activity. With insight, the present writer would concede that there is some truth in this; but as a potential 'subject', he naturally prefers an elegant description of the situation by Sir Cyril Hinshelwood. Writing in the *New Scientist* ('Exploring by language', *N.S.*, 7.1.65), he stated: 'A new language adds, as it were, a new facet to our personality and gives a new degree of freedom to our own sensibility.'

The work of the freelance translator can be most absorbing. It is a fact-finding, decision-making, problem-solving activity of the most concentrated kind, exercising simultaneously all of the relevant faculties and skills, in a process which consists of much more than mechanical transposition from one language to another. Sufficient evidence of this is that the best brains in many countries, using vast resources, have so far failed to produce machines capable of translating with the same accuracy and precision of communication as the highly skilled, experienced, professional translator.

This description of the nature of the freelance translator's work applies equally to the industrial staff-translator, the institutional translator and the agency staff-translator. Being free agents, however, freelances are able to be selective in what they undertake from day to day and are also free to choose to be generalists, covering a relatively wide range of subjects, normally for information purposes, or specialists, working within a narrow subject-range and more for publication.

Like their fellow-practitioners working in a team within an organization, freelances are a link in the information chain of communication, between the originator of the matter to be translated, expressed in one language, and the user, who has no command or insufficient command of that language and, therefore, requires the matter to be expressed in a more comprehensible language. In this role, freelances' work is complementary to that of the organizational translator, filling a gap where there is no match, qualitative or quantitative, between translator supply and demand.

Regarding sources of background information for their work, freelance translators are restricted compared with, for instance, the industrial staff translator, who will have available, on the spot at the place of work, originators of matter to be translated, engineers, research workers, records and literature, for consultation; they are also restricted in comparison with the institutional or agency translator, who is usually part of a team, with its members assisting one another from their knowledge and experience in different fields. Freelances must, therefore, organize and stock their own reference sources, in so far as they are not supplied with the necessary information by their clients in the form of past records, literature, etc. Technology is coming to translators' aid in this respect, however, with the continual development and cheapening of computers (giving access to data banks) and of word-processing equipment (enabling translators to edit their own work much faster). Not necessarily an economic proposition (in cost/benefit) to the generalist, these aids are more likely to be economic and useful to the specialist translator, because data banks are at present more available within a limited number of particular specialist fields, and because the specialist will probably be working largely for publication and will therefore derive great benefit from editing work with word-processing equipment.

What of the work of freelance translators in the future? As indicated above, their function is not generally, but can be, machine-aided, with access to computerized data-and-terminology banks and word processors. This man/machine system must inevitably become more and more loaded with the machine element, as computerization and machine translation becomes more and more efficient, until eventually freelance translators have only a minor role or none at all.

In an age when the novelist's function is, it seems, rapidly becoming a matter of juxtaposing paragraphs and sentences by word processor, in the optimum mix to interest or entertain the reader, when the doctor's diagnostic function is being taken over by the machine and when so many other activities are being taken over in this way, the day cannot be far off when freelance, staff and agency translators are redundant. In the meantime, the present writer and his fellow freelance translators find their work a most agreeable, if demanding, way of earning a living.

The translator in industry

D. Embleton, Languages Unit, ICI Petrochemicals Division

The Languages Unit of ICI's Petrochemicals Division at Wilton (Cleveland) essentially serves all of the Departments in the new Headquarters building plus all of the works and plants of the adjacent Wilton Site and other production sites in the area.

The unit comprises two full-time linguists and two part-time 'consultants' and also uses freelance and Company expertise where necessary. Languages covered by the in-house linguists are French, German, Spanish, Italian, Russian and Japanese.

The activities of the Unit have developed as a function of the nature of the Division's business (increasingly export-orientated), the degree of independence bestowed upon us by management, the fact that we live on the doorstep of the production plants and last, but by no means least, the attitude of the linguists themselves. Direct contact with our customers is always a possibility and is frequently essential. No two working days are alike and a fair amount of time is spent away from the office.

People are actively encouraged to come to our office to discuss the best approach to an into-English translation. In the majority of cases an oral translation of part or of all of the document will suffice and immediate action can be taken. The need for a written translation is sometimes revealed and there are, of course, instances where a written version is absolutely necessary (contracts, patents correspondence, papers for wide circulation, less common languages, etc). In such cases, the translation is either dictated in-house or the document is sent out to one of our 'consultants' or to a freelance. This contact with our customers has many advantages—we keep in touch with the business and climate of the Division, we cut out unnecessary work and we can devote the time saved to other equally important linguistic functions, such as:

—Co-ordination of the translating and proofreading of foreign-language prestige and product literature on behalf of our publicity department. Translations are done by subject experts resident in the target country and are checked by product managers and translators in the Company's overseas offices and by ourselves. We are involved in all of the production stages and are the liaison between authors, translators, overseas sales offices and printers. Terminology glossaries are frequently taken from the literature and are a valuable aid.

—*Ad hoc* interpreting, covering situations ranging from press visits and foreign delegations to foreign engineers working on plant equipment—and not forgetting numerous continental lorry drivers and telephone calls to obtain urgently required materials!

—Organization of language classes (using foreign nationals as teachers) and a small language laboratory and library of recorded language courses for staff.

The predominant feature of the job is that the linguists feel very much part of the day-to-day running of the Division and have opportunities to go out and uncover areas where there is a real need for a language service. It is of inestimable value to live in such close proximity to the people, plants and products with which our work is concerned and our stock of dictionaries is more than adequately supplemented by the mine of information which surrounds us. I am sure that our customers also appreciate the flexibility of approach in solving what, to many of them, are immediate problems—problems which would not be solved by 'Silence please, translators at work'.

The scientist translator

Albin Tybulewicz, Editor, 'Soviet Physics—Semiconductors', 'Soviet Journal of Quantum Electronics', and 'Soviet Physics—Solid State'

For over twelve years I have been editing cover-to-cover translation journals for the American Institute of Physics in New York. I also translate articles from journals and books (over fifty monographs so far). Previously, I was a member of the editorial team of *Science Abstracts*, ending as Editor of *Physics Abstracts* and *Current Papers in Physics*. My scientific background is a degree in physics followed by some research in a major industrial firm, broadened by the experience at *Science Abstracts*. All my work has been concentrated in physics, particularly solid-state physics, semiconductors and lasers.

These translations for publication have to be edited to a high standard, matching that of *Physical Review* and other major periodicals also published by the American Institute of Physics. My team of free-lance translators consists of qualified scientists, usually working in academic research, and a linguist who gained scientific background at a government research laboratory.

The advantages of this type of work are the narrowness of the fields covered and the consequently very specialized vocabulary. However, the vocabulary is far from identical for the three subjects covered by my journals and one often encounters words and phrases having different meanings in, say, solid-state physics and lasers. Moreover, the vocabulary is continuously changing and this is particularly true of lasers, where probably half the terms are less than a decade old and cannot be found in any dictionary.

The problems are the usual ones of poor writing of the originals, loose terminology, use of synonyms for their own sake, errors and misprints both in the text and in references. There is also the delicate matter of judging which errors to correct and which to leave.

The overriding requirements of scientifically and linguistically correct translation into good American English are further complicated by the need to obey the house style of the publisher and to produce the translations six months after the nominal publication date of the original. Since the Russian originals generally arrive in the month following their nominal publication, the maximum time for translation and editing is two months, because setting and printing in the USA takes three months. Nevertheless, close co-operation with the editors of one of the Russian originals (*Kvantovaya Elektronika*, translated as *Soviet Journal of Quantum Electronics*) usually makes it possible to achieve publication after a delay of less than six months. Readers looking at my journals in libraries should bear in mind that the library in question may have selected (at a saving of literally a few dollars) the surface-mail rate delaying the journal by perhaps six weeks. Moreover, frequent postal and other strikes on both sides of the Atlantic play havoc with the mailings.

I have mentioned above the problem of vocabulary sometimes changing very rapidly, as is the case in quantum electronics (lasers). This is one of the major problems facing the translator and editor of cover-to-cover journals working against tight deadlines. There are no up-to-date dictionaries so the solution is to look up the English-language references cited at the end of the Russian article, compare recent monographs in the original English and translated Russian versions, and check in suitable reference books and monographs. Outside my own fields, I consult a small band of experienced colleagues: Julian Barbour for mathematics, John Sykes for theoretical physics and linguistic problems, and Boris Uvarov for chemistry. This is valuable help, which I receive in exchange for similar aid in physics. Another source is the feedback of comments and queries from translators. All this information slowly builds up into an extensive card file, which has become my chief lexicographical aid. I consult published bilingual dictionaries as a last resort. To keep abreast of current topics in science, I attend several specialized physics conferences in Britain or the USA every year and read *Scientific American* and other high-level general scientific journals.

The satisfaction I obtain from editing and translating scientific material is similar to that of any other job done well and on time, especially as all the journals, individual articles, and books that I have handled are always signed. The work provides contact with my colleagues who edit other cover-to-cover translations for the American Institute of Physics. We meet regularly in New York to exchange ideas with the aim of maintaining the same high level in the nineteen translation journals as in the original journals published under the same roof. In the case of books there is an additional satisfaction of an occasional reviewer noticing the quality of translation: unfortunately, this is an exception rather than the rule because usually reviewers either comment adversely on the translation or not at all.

Dictionaries and reference books for the translator

John Alvey[*]

Chief Translator, Departments of the Environment and Transport

ONLY THE BEST translator working in a narrow specialist field and in only one or perhaps two foreign languages can do without dictionaries. For most of us dictionaries and other works of reference are essential tools. It is often thought that translators can get by on two or three dictionaries—more than once a client has asked me, when I told him that I was unable to find a word: 'Why don't you look it up in *the* dictionary?' And it is not only non-translators who think in this way. I have come across freelance translators who work with a general Cassell's dictionary and an out-of-date multilingual technical dictionary. One freelance translator told me he used Patterson's (not very good and not very comprehensive) *French–English Dictionary for Chemists* for all his French work!

The main problem with dictionaries for freelance translators and staff translators working for organizations with restricted budgets is cost. The standard general German–English dictionary (Muret-Sanders) costs around £80, the standard Swedish–English technical dictionary (Gullberg) around £70 and so on. There are quite a few good dictionaries costing over £100 and very, very few costing under £10. For those living in or around London there are various libraries one can consult—the Science Reference Library at Holborn and Bayswater, the Central Reference Library, St Martins Street, WC2, the libraries of certain universities, national institutes and certain special bodies and some public libraries. I have even seen people use the stock of Foyles and Dillons as libraries! Outside London the poor translator must rely on his local public library and university library if he can gain access.

The next problem is finding out what is available. There is no central point or comprehensive bibliography where one can find out what is available. The problem is more difficult than is normally the case for librarians selecting books in that a great amount of the better works of reference will be published abroad, usually in non-English-speaking countries. The French translator will probably not have too many problems, though many useful works of reference are published in Canada. For the Russian translator it is more difficult, however, as many of the better works of reference are published in the USSR and have a habit of going out of print very quickly. Indeed, apart from some standard

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[*] I prepared a list of sources of information concerning technical dictionaries for a recent talk I gave to the Aslib Technical Translations Group. Copies of this list can be obtained by sending a stamped addressed (long) envelope to me at: Room P3/008a, Departments of the Environment and Transport, 2 Marsham Street, London, SW1P 3EB.

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works (such as the works of Marx and Lenin) it is almost impossible to obtain anything published in the USSR more than a year or two after publication. The Spanish translator will also have his problems as he may find a suitable dictionary is published in Peru or Mexico.

How does the translator find out about these different sources? A good start, for translators who can get to London, is the libraries mentioned above, where one can actually see the dictionaries in question and get some idea of their use. Booksellers both in the UK and abroad can be a useful source. Many specialist dictionary booksellers issue catalogues, for example, Grant and Cutler in London, Bailey Bros and Swinfen in Folkestone, Dillons (German dictionaries) in London, Collet's (East European languages) in London, La Maison du Dictionnaire in Paris, etc. Publishers also put out lists, for example, Elsevier, Harrap, VEB Verlag Technik. A wide variety of bibliographies is available. Various libraries list their holdings, including the various international bodies (EEC, Food and Agriculture Organization, United Nations, Council of Europe, UNESCO), libraries in this country (British Standards Institution (building dictionaries only), Camden Reference Libraries, Central Library of Manchester, Canning House Library (Spanish and Portuguese), Centre for Information on Language Teaching and Research, Department of Trade and Industry, Ealing Reference Libraries) and libraries abroad (Régie de la langue française, Quebec, Library of Congress, Bundesanstalt für Vegetationskunde, Naturschutz und Landschaftspflege, Bonn). There are also several excellent bibliographies covering or including dictionaries (Brewer: *Dictionaries, encyclopedias and other word-related books*; Walford and Screen: *Guide to foreign language courses and dictionaries*). Finally, periodicals are a good source, particularly of new dictionaries. This includes specialist translating periodicals such as the Aslib *Technical Translation Bulletin*, *The Incorporated Linguist*, *Babel*, *Lebende Sprachen*, etc., as well as specialist scientific and technical periodicals which sometimes give details of dictionaries in their fields.

With dictionaries commanding such high prices translators cannot generally afford to buy everything in their language(s) and subject(s). Unfortunately, unless you can get to see the dictionaries in a library or bookshop, most of the sources above are not going to be suitable from the point of view of indicating quality. Unfortunately, there are many dictionaries published which are really of little value to the translator. It is a truism that a dictionary is out of date as soon as it is published. Many dictionaries are out of date well before they are published, repeating the errors of their predecessors (one dictionary compiler told me that part of the art of making a dictionary was to lift directly the work of your predecessors, but to paraphrase it so that it did not look as though it had been lifted), using out-of-date terms and artificial terms never actually used in practice, incorporating a range of terms well outside the scope of the dictionary as padding and, of course, often omitting the term you are looking for. Neither the price nor publisher are any guide to quality as there are bad, expensive dictionaries and the better-known dictionary publishers have some dross among their better works. There is really no solution to the problem except trying to see the dictionary before purchase, reading the few reviews that do occur and consulting other translators. Most translators have found out by trial and error what is good and bad, leaving their bookshelves cluttered with many works of reference never touched.

If you want a general German–English technical dictionary you have a reasonable choice. However, if you are looking for a Serbo-Croat–Turkish dictionary on jam-making you will (I imagine) be unlucky. Many subject/language combinations are not covered or covered only to a very limited degree. People working to and from English are luckier than most in that most multilingual dictionaries include English and there is a greater demand for dictionaries including English and, therefore, a greater supply. Our Serbo-Croat jam-making friend will probably try to find a suitable dictionary in Russian which will not necessarily solve his problem.

Most translators find that there is no suitable dictionary in a particular area they are interested in and it is then that they turn to other works of reference. In fact most translators are wary of bilingual and (particularly) multilingual dictionaries and will make extensive use of other works of reference. Monolingual dictionaries are usually invaluable. In English Chambers and the McGraw-Hill *Dictionary of Scientific and Technical Terms* are invaluable for general technical terminology. Specialist monolingual dictionaries such as the Penguin ones and a wide variety of other specialist ones are essential for many translators. Some of the Penguin dictionaries and the Chambers as well as other monolingual dictionaries are also available in various foreign languages and these can be particularly useful as they will often give more up-to-date terms and the actual term as used in the country, instead of an artificial term. Other useful works of reference include standards, which often give definitions (see the *International bibliography of standardized vocabularies* published by K. G. Saur), trade directories which are often multilingual, trade catalogues, standard textbooks both in English and the foreign language, regulations, thesauri, bi- or multi-lingual texts, handbooks, etc. These can often be more useful than dictionaries (and are often cheaper!).

What of the future? With prices for books likely to increase further and publishers cutting back on the range of books made available the problem is liable to become more difficult. It seems likely that translators will turn more and more to modern aids. Some dictionaries are already made available on microfiche only and this may increase. However, it is computer-based systems which seem most attractive for the future. Several terminology data banks already exist: in North America there are the University of Montreal, IBM and the CETA (= Chinese/English Translation Assistance) Group in Kensington, Maryland, while in Europe there are the Siemens TEAM system, the Bundessprachenamt LEXIS system, the Technische Universität, Dresden system and the EURODICAUTOM system of the Commission of the European Communities, Luxembourg. Other systems are being planned in South Africa, Canada, USA, Israel, West Germany, Denmark, Finland, France, UK (UMIST), Yugoslavia, Norway, Poland, Sweden, Switzerland and the USSR. The idea behind these systems is that translators should have access to a terminal where they could key in a word and get a translation into the language(s) they wanted. With the systems in their infancy there is still a low success rate but as more and more words are stored the systems will become increasingly useful. EURO-

DICAUTOM should soon be available in this country through EURONET. Perhaps by the end of the century the translator's entire dictionary resources will be available through a computer terminal—though the translator might well be a machine.

Services provided by Aslib relating to translations

Wendy Glover

Translations Officer, Aslib

This article gives a brief summary of the services relating to translations available to corporate members of Aslib. It describes the purpose and development of the Aslib Index of Unpublished Translations, and then describes the contents and format of the Index. The article goes on to advise members how the Index operates and how best to approach it. The article then describes the relationship between the Index and the British Library Lending Division and asks members to notify Aslib of their translations on a regular basis. There follows a brief description of the Aslib Register of Specialist Translators with information on the method of selection of the translators included in the Register, and on the way in which the Register is utilized to recommend translators to corporate members of Aslib. The article finishes with a description of the Aslib Dictionary Index.

The Aslib Index of Unpublished Translations

History

THIS CARD INDEX to locations of translations was established at Aslib in 1951 to avoid waste of money by preventing duplication of translation effort. In 1960, an exchange system was arranged through the Commonwealth Scientific Council which enabled various Commonwealth centres to receive copies of all entries in the Index, then called the Commonwealth Index of Unpublished Translations. In return Aslib was supplied with details of translations notified to these Commonwealth centres. At this time, the Index was supported by British Government funds, and so access to the Index was available free to all organizations and individuals. For overseas organizations, Aslib was willing to try to obtain copies of translations listed in the Index.

In 1975, both the British Government support for the Index and the co-operation of the Commonwealth Scientific Council ceased. Aslib was unable to support the cost of distributing copies of entries from the Index to the Commonwealth centres in the scheme, and so the scheme ceased to operate. For these reasons, all services relating to translations have had to be limited to corporate members of Aslib.

Contents

The Index is a card index with approximately half a million entries. No translations are held at Aslib; the Index merely supplies the name of an organization which holds a particular translation. Most of the information in the Index is taken from lists supplied by over 400 organizations both in England and abroad. Some of these lists are freely available, but many lists are produced only for the use of the organization itself and a copy is sent to Aslib, so that Aslib is the

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only external source of information about these translations. In some cases, Aslib is the only source for the translations themselves, because if an organization wishes to keep confidential the subject in which it is doing research, then Aslib will arrange to make that organization's translations available to enquirers without revealing the source of the translations.

The translations listed in the Aslib Index include the majority of translations entered in the British Library Lending Division Translations Index, and a number of American translations which have been deposited at the National Translations Centre in Chicago and listed in *Translations Register—Index*. Any translations listed in publishers' catalogues and library accessions lists are also noted. In the case of journals which are translated completely from cover to cover on a regular basis, a note is made of the dates covered by the translation, but no entry is made for individual articles.

As a help in avoiding duplication of effort, a record is made of intention to translate; that is, a record of items which are in the process of being translated or will be translated in the future. A record is also made in the Index of all enquiries, so that if more than one organization is interested in a particular item, only one organization need commission a translation but perhaps on a co-operative basis with the other interested organization.

The index includes only translations into English, but there are no restrictions on the language of the original, nor on the subjects covered. Naturally, the contents of the Index reflect the bias towards science and technology shown by the organizations which notify Aslib of their translations.

Format

Details of translations of periodical articles are filed alphabetically by the title of the periodical in the original language. As some sources do not quote the periodical title accurately, it is important to quote all the information known, since, for example, knowing the country or language of the item may help in establishing the correct spelling. If there is any ambiguity, it is often best to supply a photocopy of the original article or the source of reference. Within each periodical title details of articles are filed chronologically, that is by year, volume, part number and pages. There is no access by author, but because the organizations notifying Aslib occasionally give incomplete references, the author may be needed for complete identification of a translation reference. The periodical section includes entries for some of the better known report series, and these are filed alphabetically by the report code, and then numerically by the report number, but most reports are filed under the author's name in the author section.

The author section is housed separately from the rest of the index, due to weight load restrictions on the building. It includes details of any item which is not a periodical article, patent or standard. If there is no personal author or editor, then the item is entered under the issuing organization. Some items such as decrees and safety regulations are filed under the country of origin, so even if an issuing body is quoted, it may be helpful to state the country of origin. It is important to give as much information as possible. For instance, if an item is an extract from a book, the editor of the book should be quoted as well as the author of the item.

Patents and standards are filed by country of origin. Patents are usually straightforward, being numbered chronologically. Sometimes the year of issue is a necessary part of the reference. Standards can be difficult to identify. They are filed alphabetically by the standards code, which is usually derived from the initials of the issuing body, then by the number. It may be helpful to quote the issuing body, and to state if a particular edition of the standard is needed.

Using the Index

Enquiries are accepted by telephone, telex or letter. Enquiries by telephone are usually dealt with on the spot, unless it is necessary to check in the basement. Other enquiries are dealt with as soon as possible, often in the same day. Delays occur only if it is necessary to check an inadequate reference in outside sources.

If the enquirer is a corporate member of Aslib in the UK, the name and address of the organization which holds the translation is supplied together with any information provided by that organization, such as reference number and price. There are a few organizations who have asked that their names should not be given to enquirers, and in these cases, Aslib will try to obtain a copy of the translation for the enquirer. Note that most translations in this category are only listed in the Index, and are only available through Aslib.

If the enquirer is an overseas corporate member of Aslib, Aslib will try to obtain a copy of any translation listed in the Index as available in the UK, with the exception of items available from the British Library Lending Division, as it is assumed that the member has access to this source. Many overseas organizations find it convenient to give a blanket instruction as to the maximum they are willing to pay for any one translation, so that when future enquiries are received from them, Aslib will automatically apply on behalf of the enquirer for copies of any translations available in the UK up to this amount without referral to the member. It should be pointed out that in most cases copies of translations are available from the holding organization without charge. Overseas organizations are sometimes referred to Aslib by centres with copies of the Commonwealth Index of Unpublished Translations. Overseas corporate members of Aslib should note that these centres do not have copies of any of the entries made to the Index since 1975. When applying for a copy of a translation listed in the Commonwealth Index, it is important to quote the full reference, as the GB reference number is simply a code indicating which organization holds the translation, and does not enable Aslib to identify the translation.

It is sometimes asked whether it is advisable to send an enquiry both to Aslib and to the British Library Lending Division. There is no simple answer to this question. A large number of the translations listed in the Aslib Index are held at the BLLD, and in these cases it would save time to apply directly to the BLLD. There are some translations held by the BLLD, as part of various report series or contained in selective translation journals for instance, which may not be listed in the Aslib Index. Equally there are many translations listed in the Aslib Index which are not held by or known to the BLLD. Also, because Aslib lists translations in preparation, or being considered, Aslib's records are more up to date.

The BLLD telex Aslib daily on a selective basis with details of requests for translations that they are unable to satisfy and the Index provides a location in about 4 per cent of these cases.

Notifications

Aslib is always pleased to be notified of details of translations which an organization is willing to make available to other organizations. If a list of translations is circulated within an organization it is useful if a copy of this or, alternatively, duplicates or photocopies of file cards of translations is sent to Aslib. Details such as whether translations are edited, whether they may be lent or photocopies supplied, and whether there are any charges are also useful. As already mentioned, it is possible to preserve confidentiality by channelling requests through Aslib. It is appreciated if all notifications give full details of the original article, to enable the details of the translations to be filed correctly.

The Aslib Register of Specialist Translators

To help corporate members of Aslib, a list of translators is maintained. These translators are competent both in a foreign language and in a specialized subject to degree level. Before being accepted on the Register, each translator completes a questionnaire asking for details of his/her academic qualifications and practical experience, work both in the subject and as a translator, length of residence abroad, mother tongue and any other relevant information. Two referees who have knowledge of the translator's work are approached, and a translator is not added to the Register until a satisfactory reply has been received from both referees.

The Register is indexed by language and by subject, using feature cards (optical coincidence cards). Each translator is assigned a number and a hole is punched at the position for that number on a card for each language and subject offered by that translator. In answer to an enquiry, the appropriate language and subject cards are superimposed, and the position of the coincident holes gives the numbers of all suitable translators. The full details of the translators, including the details of each occasion on which Aslib recommended them, are filed in numerical order. Because the subjects offered by each translator are defined as accurately as possible, it is important for enquirers to give a clear idea of the subject matter to be translated.

To keep details of fees, addresses and telephone numbers up to date, a form is sent to each translator once a year. If the form is not returned it is assumed that the translator no longer wishes to be on the Register; his name is kept, but he is no longer recommended. In case the form is lost in the post, or is not returned because of an error, another form is sent the next year, but if no answer is received to the second form, that translator's name is removed from the Register.

It helps to monitor the capabilities of each translator if the Register receives comments on his work by the organizations that have used him. It is very useful to know the particular strengths and weaknesses of each translator.

No charge is made to the members of Aslib who use this service, nor does Aslib receive a commission from the translators. In view of the wide range of fees charged by translators, no recommendations concerning fees are made. The Register does not include agencies or bureaux, and all translators sign an undertaking to do in person all work obtained through Aslib's recommendations.

Aslib Dictionary Index

A file of details of dictionaries in two or more languages is maintained. This information is recorded on feature cards in the same manner as the Register of Specialist Translators. The details of dictionaries are taken from publishers' catalogues, *British National Bibliography*, the *Bookseller* and accession lists from outside libraries. Details of locations are noted when shown on these accession lists. Lists of dictionaries with specified language/subject combinations can be compiled. As Aslib does not examine the dictionaries listed, it cannot make recommendations.

It is hoped that this article provides useful background information on the history, arrangement and use of the Aslib Index of Unpublished Translations and that it will give guidance to readers as to how to make use of hitherto unexplored foreign-language information sources.

Translating and the Computer

Proceedings of a Seminar held in London, 14 November, 1978. Organised by The Technical Translation and Informatics Groups of Aslib.

edited by BARBARA M.SNELL, *Rank Xerox, Ltd., Member of the Aslib Technical Translation Group Committee, and Member of the Translators' Guild Committee.*

1979 xi + 193 pages Price: US $29.25 / Dfl. 60.00 ISBN 0-444-85302-2

Machine translation has re-emerged after a long period in limbo and there is growing evidence of its value. Computer systems can assist with the everyday problems of translations in an increasing variety of ways, including machine dictionaries.

It was felt that the time had come for translators to take their heads out of their dictionaries and to look at what had been happening in the computer world since the prospect of machine translation was dismissed a decade ago. While translators had been exchanging their manual typewriters for electric models and gasping with dismay at the cost of every new edition of a dictionary, computer scientists had not been idle.

The primary purpose, thus, of this one day seminar was to bring together the language and computing disciplines and, by familiarising translators with developments in this field and by drawing the attention of the designers of computer systems to the translator's practical needs, to demonstrate how their activities can interact with - and benefit - each other.

CONTENTS: Introduction List of Speakers. **Session 1:** Multilingual communication Chairman's introductory review of translating and the computer *(J C. Sager)*. Machine translation and artificial intelligence *(Y Wilks)*. Implementing machine aids to translation *(E. H. Tanke)* EURODICAUTOM *(J. Goetschalckx)* Machine translation and computerized terminology systems - a translator's viewpoint *(P. J Arthern)*. **Session 2:** Error analysis of systran output - a suggested criterion for the 'internal' evaluation of translation quality and a possible corrective for system design *(F Knowles)*. An interactive on-line machine translation system (Chinese into English) *(S-C. Loh and L Kong)*. Computer aided translation - a business viewpoint *(J. S G. Elliston)*. **Additional Contribution:** The essential skills to be acquired for machine translation *(M. Mastermann)*. List of Participants.

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Notes for contributors

Aslib Proceedings now accepts contributed papers in addition to those presented at Aslib meetings and conferences. They should be of a practical nature and of some relevance to problems encountered in the everyday operation of library and information units, or services. Other kinds of contribution which will be considered for inclusion are short notes on new information units or special libraries; the introduction of new techniques or systems in existing libraries where these may be of general interest; equipment designed by members for special purposes and put into operation in their own organizations; and objective reports on experience with new 'packaged' commercially available information services.

Contributions, which should be typewritten, double spaced, single-sided on A4 paper, and not more than 3,000 words in length, should be addressed to the Editor, Kathleen Gray, *Aslib Proceedings*, 3 Belgrave Square, London SW1X 8PL. If possible, authors should include a summary of up to 200 words with the typescript. Authors will receive twenty-five offprints of their article free of charge.

Are you getting in the way? (on person-dependence in information systems)

Judith Collins and Ruth Finer

Consultants in information management
(formerly of Aslib Research and Consultancy
Division)

Based on a presentation given at an Aslib Evening Meeting, 23rd May 1979

AFTER A DISCUSSION of what we mean by 'person-dependence' and how we have come to recognize it, we present some examples of this phenomenon, based on observations we have made during the course of our work as consultants and thus taken from real life, but let us assure our past and present clients that the names have been changed to protect the guilty! The case histories are presented in a fairly light-hearted way, but when we encounter a case of person-dependence in a client organization we certainly do not treat it lightly. After the examples we draw some tentative conclusions about the factors within organizations which can lead to person-dependence.

First of all, then, what do we mean by 'Are you getting in the way?'? We probably all have a picture in our heads of the ideal special library or information unit. It is in a nicely decorated, well laid-out room, it has a good stock funded from a generous budget, the stock is well classified with an appropriate scheme, there is a good catalogue, it offers a range of services such as current awareness, retrospective literature searching, enquiry answering and maybe some SDI, and there are specialized indexes to significant subject areas. This unit is staffed by happy and informed people who know what they are doing and why, and the users are never unreasonable in their demands.

When we are called in by the management of an organization to help set up an information unit or library, it is that type of ideal that we sell to them. But when we are called in to review or advise on the future of an existing unit we rarely find anything of the sort. In the course of our work we have had the opportunity to observe a large number of libraries and information units, and we have found that a significant proportion of them fall short not only of this ideal, but also of an effective level of information service provision. Of that number, which for want of a better word we shall call inadequate, there is an identifiable group where the inadequacy is caused by the personal idiosyncrasies of the staff of the unit—where the staff are getting in the way.

Over the years we have learned to apply a simple acid test which indicates the extent to which this is the case. The question we ask is this: do the services provided from this information unit reflect the needs of the users, or do they reflect rather the dispositions of the information workers? Where the services

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relate to the needs, interests or knowledge of the staff of the unit then, in most cases, those staff are obstructing adequate information provision.

The case histories which follow are a few of those collected over the years to illustrate the different situations in which person-dependence can manifest itself.

I've always done it this way

This first example concerns a medium-sized multi-site engineering company. The information services were quite sophisticated and apparently well-balanced, in that there was no one service which took up a disproportionate amount of the five information officers' time. One of the services provided was the monthly production of a series of current awareness bulletins, each dealing with a specific area of the company's business. These bulletins were attractive, well designed, and contained indicative abstracts of the current literature, they were subject-indexed, and the indexes were cumulative.

We had been called in to advise on the microforming of the material from which the bulletins were built up. Our first impressions were positive, but as we got more deeply into the microforming exercise, we discovered that one bulletin in particular very rarely produced any response from its target readers—they hardly ever requested any of the source articles. We then found out that the subject area of that bulletin covered a part of the company's business that had been sold off three years before.

The bulletin was still in production because the Chief Information Officer knew a lot about the subject (in fact it was her original subject specialism), and she refused to allow her accumulated knowledge to get out of date. She still scanned journals relevant to that field, still made and indexed the abstracts and circulated the bulletin, even though the company was no longer interested.

This degree of person-dependence in a system is one which sounds warning bells in our heads. Here is a case where its effects are quantifiable—in terms of time and money—and, more importantly, where a library/information service has been diverted from the organization's needs to fulfil those of the information officer.

What, little old me?

We were once called in to an organization to give advice on the staffing of the library and information service. For ten years the role of librarian/information officer had been fulfilled by a very competent woman who was originally secretary to the research and development manager. She found herself looking after the R & D department's collection of books, journals and reprints, and then got diverted more and more into the role of information officer for the team. Eventually the company realized that its whole set-up needed formalizing, and Ms A. took over properly, with the assistance of half a clerk-typist.

Over the years Ms A. had built up considerable expertise, learning on the job, but the time came when she (and her management) recognized that the growth and diversification of the company called for information services which the staff establishment at that time could not cope with—and that is where we came in.

One of the exercises we carry out during the investigative phase of a project like this is looking at how the staff spend their time. In this particular case we were surprised to see that a rather high proportion of Ms A.'s time was spent in handling inter-library loans. The actual volume of traffic was not particularly high, but the time spent dealing with it seemed disproportionate. What is more, the actual elapsed time for fulfilling the average request was nearly a month. So we took this further. We asked Ms A. to explain the procedure she followed. She showed us the duplicated letter she used for requesting items, and the records she kept of all the loan transactions, which documented all the sources she tried for each item.

When we went through the records, we found that although most of the items requested looked very straightforward, Ms A. was not sending many of them to the British Library Lending Division at Boston Spa, but was trying a wide variety of other libraries up and down the country. When we asked her why, she said that she didn't think it was fair to bother the British Library with all her requests when they had so many more important things to do. 'Why should I expect them to do all that work just for little old me?'

This librarian had simply not had the opportunity to gain an appreciation of the true role of the British Library in her daily work.

I don't believe in change for change's sake

The organization where we heard these immortal words is large and non-profit seeking. We had been invited to give guidance on the best way of moving the library (with the rest of the organization) some miles away. Entering the old library was like going through a time warp—the shelves were full of beautifully bound volumes meticulously arranged, the gold tooling on the spines glinting in the sunlight. On moving closer, one could not help but see that most were journals in ten- and twenty-year runs. Further inspection showed that some of the titles were weekly periodicals, the contents of which were ephemeral, to say the least. And here they were, wonderfully bound and preserved for posterity.

Chatting with the librarian produced the information that her predecessor had gained his library experience in a gentlemen's club, and his particular competence (and enjoyment) lay in organizing the binding programme. The current librarian had accepted his values completely, and had continued putting most of her efforts into the journal binding. We suggested that there were other things in life than journals—books, pamphlets, HMSO publications, etc.—that would enhance the collection and even be of value to the organization! She informed us that such materials were not to be stored in the library—in the library they were concerned with journals. Any of our attempts to introduce change led to the response, 'I don't believe in change for change's sake.'

This example is particularly sad and would not have arisen if the library's objectives had been stated initially. But the entire purpose and potential of a special library within this organization had been thwarted. In the organization's terms a library was where the bound journals were kept. This perversion had evolved as a direct result of the previous librarian's lack of imagination and skill, and had been inherited by the current librarian for similar reasons—person-dependence to the second generation.

Nobody knows the trouble I see

In a small, young, mission-oriented organization a newly qualified librarian was appointed to organize the information store. No one in the organization had any experience of services offered by special libraries, so it was a case of inexperienced librarian meets inexperienced users. The particular difficulty was that the sorts of services and products which would best have served this organization were outside the mainstream of experience that is generally passed on in the library schools. So the systems the librarian set up were inappropriate, and neither he nor his users knew why that was so or what could be done to change them. As the librarian saw it, he was doing the job of librarian as he had been taught; as the users saw it they were being provided with a series of systems that they themselves could not use but assumed were 'proper' because the work of a professional librarian. All enquiries had to go through the librarian now; at least before they had been able to find their own way around their own muddle.

It was after this had been going on for some time that we were called in, and during the discussions we had with the librarian he told us at great length how lonely, unsupported and misunderstood he was, and how the users expected him to be able to read their minds.

This inexperienced librarian setting up a specialized service in an organization with ill-defined expectations of his work inevitably led to person-dependence. The librarian was professionally isolated. He had no idea of what alternatives might exist, how other people in similar situations cope with similar problems, or indeed that there are other people coping with similar problems.

But what else should a good father do?

One job we were involved in concerned the development of a thesaurus in an information unit in one of the European agencies whose special feature was an enormous optical coincidence card system. Most of the work for this system was done by a team of four experienced information officers. They spent a great amount of their time scanning journals and indexing items, and they also did much of the retrieval. At the time we were visiting the organization the team had been together eighteen months, right from the start-up of the system, although the information unit itself had of course been going much longer.

This information service based on the optical coincidence system had been the brainchild of the unit manager; he designed it to fill a real gap, and it was and is a much-used service—he had gained a good deal of kudos from it. Unfortunately, though, he really did regard it as his 'baby', and almost resented the fact that he couldn't operate it totally by himself. So what he did was check every item that had been indexed by the information officers, not to make sure that they were applying the terms consistently, but to make sure that they were including what he considered the 'right' items.

This had two significant effects. Firstly, it meant that the manager was allowing his attention to be diverted from other aspects of the unit's services which were in dire need of appraisal. Secondly, it meant that the team of four became more and more demoralized as it became more and more apparent that the manager would never let go. They felt that it was not just a case of his hating to delegate, but that he really did not trust them. After all, they were now in a much better position than he to predict users' needs; in fact they knew more about the way the system should run than he did.

We heard subsequently that within the following six months three of the four left this unit for jobs elsewhere in Europe. This is surely a case of someone really getting in the way.

Please allow me

We heard this pleading phrase many times during the interactions between the librarian of an international organization and her users. In this set-up the librarian reported to the manager of office services and was on an equal grading with the photocopy machine operators and the canteen staff. As soon as anyone entered the small library our librarian would leap to her feet and hover behind the user as he approached the catalogue or the shelves. She was doing this not because she was a dragon who hated to see the users messing up the shelves, but because she saw that everyone in the organization was her superior and hence much too important to spend time in the library looking at the books. Instead she would offer to do that for them while they went about their more elevated tasks. The net result of this was that the library was rarely used—she had got in the way.

I'll do that

This example occurred in a large manufacturing company which, during the economic crises of 1973 to 1978, had been rife with redundancy and rumour of redundancy. We were to do some work in the research division of this company, which division had a history of particular vulnerability as far as redundancy was concerned. The information staff consisted of two information officers, a librarian and a typist, with the librarian as overall manager.

We were shown around the library and eventually led into a small office where one of the information officers worked amidst her peek-a-boo cards and her thesaurus. We say 'her' deliberately because this is exactly what they had become; no one else was allowed to look at, let alone use, her system. All requests for information had to be routed through her and she manipulated the cards and produced what was wanted.

She was an attractive and intelligent person who had been with the company for about twelve years. When *we* talked with her about her system she was quite open and was patient to explain its working, but when any other member of the staff was present she became unwilling to discuss anything to do with her work. We got to know her quite well and one day over lunch she admitted to us that the method she had adopted to avoid redundancy was to make sure that she was the only person in the organization who had the key to the information. She was using the system to shore up her position in the working unit, with the inevitable result that she was in the way.

Tentative conclusions

The cases we have described cover quite a wide range of situations, but the one thing above all else that they have in common is that the effectiveness of the library and information services has suffered because those services reflect the predispositions of the providers rather than the needs of the users.

Some of the phenomena we identified proved to be a significant cause of the ills we were brought in to diagnose and treat. Some of them we discovered purely incidentally. But once person-dependence in an information system has been identified, it must be investigated further before the situation can be remedied. Person-dependence may arise from one of three sources: first, it can (simply!) be a matter of personality; second, it can be directly attributed to a management directive; and third, and most complex, it can arise out of a personal reaction to the organizational environment.

We have found that we can draw up a list of organizational factors which help to create that organizational environment in which person-dependence is generated. We believe that by bearing these in mind we can help our clients more effectively.

Our list of factors is presented in random order; we would be pleased to entertain suggested additions or amendments. Person-dependence in information systems may arise where:

—an organization is open, non-hierarchical, perhaps mission-oriented, and staffed with people with specific expertise;
—an organization has no previous experience of formal information systems;
—the information worker has low status within the organizational structure;
—the information worker is professionally isolated;
—professional isolation develops into deliberate isolationism;
—there is a lack of organizational objectives for the library/information service;
—there is a lack of awareness on the part of the information staff about the organization's priorities;
—there is no hope of promotion for any information worker within the organization;
—there is an actual or potential attack on the value of the library/information service, in terms of either job security or severe budget restrictions.

Postscript

Sliding momentarily into the role of goad to our profession, we would suggest that if any of the organizational factors listed above are reflected in the organization where you work, then we believe that there is a chance that *you* are getting in the way.

Chemical Abstracts material on-line

Frances H. Barker

Education Programme Co-ordinator,
UKCIS, University of Nottingham

Paper presented at an Aslib Chemical Group Evening Meeting, 8th February 1979

CHEMICAL ABSTRACTS ISSUES and Indexes have been available in printed form since 1907. Microform versions are also available now. In the near future Chemical Abstracts material will be accessible by computer in the UK via six on-line systems and one batch current awareness system. This variety of modes of access is further diversified by the variety of ways in which the original Chemical Abstracts Service (CAS) files have been implemented for use with the different search systems, and by the differences in the system facilities, pricing structure and technical back-up offered by the service suppliers. This paper attempts to bring together in tabular form factors which should be considered in taking rational decisions on how to get the 'best' out of Chemical Abstracts material, the 'best' being the optimum performance/cost ratio for any given topic.

The Chemical Abstracts Service (CAS) files offered by the various machine-based systems are summarized in Table 1. Descriptions and pricing information for the CAS machine-readable files may be found in the UKCIS Catalogue; data elements are discussed in *UKCIS Manual No. 1*, and full details of file content are given in the *SDF Manual.*[1]

A search of CA Condensates (CACON) alone is equivalent to searching CA Issues. CA Condensates does not contain abstracts but since the machine scans all words in titles and keyword phrases, a CA Condensates search is often more satisfactory for 'concept' searches than a manual search of CA Issues. However, the absence of any control on representation of chemical compounds in titles or keywords renders CACON a mediocre base for retrieving information on specific chemical compounds and a poor base for any sort of Substructure Search *via* Nomenclature (SSVN).

These deficiencies are immediately rectified by combining CACON with the CA Subject Index Alert (CASIA) file.[2] This file contains CA Volume Index entries including the controlled Chemical Substance Index Data (CA Systematic Name, Molecular Formula, CAS Registry Number).

A new file, CA SEARCH, introduced in July 1979, combines CASIA and CACON material, and the separate files are no longer available. Two further files were introduced at the same time: CA BIBLIO which contains the CA Bibliographic material only; and CAN/REG which links CAS Registry Numbers with the documents containing them. CA BIBLIO can be thought of as CA Condensates without Keyword phrases. CAN/REG provides a means of automatically relaying groups of Registry Numbers retrieved manually or from

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on-line dictionaries into bibliographic files for display of records and linkage with other concepts.

Chemical Biological Activities (CBAC) is a 'mission-oriented' file covering interactions of chemicals with biological systems. It forms a major part of the composite files Toxline/Toxback. The original CBAC file was equivalent to CA Sections 1–5 and contained the same information as CA Condensates plus Abstracts and Registry Numbers. In 1975, CA Sections 62–4 were added to the Toxline/Toxback files and in 1978 Sections 9, 59, 60 were added. Thus about 17 per cent of CA abstracts are now searchable *via* Toxline.

Chemical Industry Notes (CIN) is a techno-commercial database covering areas such as production, sales, prices, facilities and regulations which do not fall in to the scope of Chemical Abstracts itself. Material for CIN is selected from a special set of eighty primary publications.

CAS MATERIAL	DIALTECH	DIALOG	INFOLINE	ORBIT	BLAISE	BRS
CACON (8th C I)	√(b)			√		√(a)
CACON (9th C I)	√(b)					√(a)
CACON (10th C I–Mid 1979)	√(b)					√
CACON/CASIA (8th C I)		√		(√)		
CACON/CASIA (1972–Mid 1979)		√	(√)	√		
CA SEARCH (Mid 1979→)	√(b)	√	(√)	√		√(b)
CBAC (plus)					√	
CIN		√		√		
Patent Concordance		√				
Dictionary (RNF-based)		√	(√)	√	√	

(*a*) *Off-line Search with optional on-line viewing of results.*
(*b*) *CACON Records to be progressively amplified with CASIA data starting with Registry Numbers and Molecular formulae.*
(√) *Projected; not yet available.*

TABLE 1: *CAS derived files/on-line systems/UK (July 1979)*

The CA Patent Concordance links 'patent families' and gives the citation for the first patent in the family to pass through the CAS system. This is the only one for which abstract and index entries are produced. It is, therefore, unwise to limit patent searches to a particular country since this may result in loss of retrieval. Suppose we require British patents on X. We should conduct the search by first looking in the bibliographic file(s) *for all* patents on X. We should then check non-British patents in the CA Patent Concordance to see if a British equivalent exists.

The sheer size of the combined CACON/CASIA files has led many on-line suppliers to split the detailed fields on chemical compounds out of the search files, leaving only CAS Registry Numbers as search keys for specific compounds. Systematic and non-systematic names, molecular formula and other compound-oriented information is held in a separate chemical dictionary. This may be used as an aid to find Registry Numbers for use in the search files or as a file in its own right, for example, to check whether two trade names refer to the same structure or to find alternative names for use in handbooks such as the *Merck Index*. The first chemical dictionary, *Lockheed's CHEMNAME*, was built from CASIA information supplemented with CA Index Guide cross-references and synonyms from other sources. More recent dictionaries are built from the CA Registry Nomenclature File (RNF) which is an integral part of the CAS Registry System. To appreciate the importance of the RNF and of CAS Registry Numbers it is necessary to understand the principles and functions of the CAS Registry System. There are several authoritative papers on this subject.[3,4,5,6,7]

Table 2 summarizes 'service features' of the six on-line systems operating in the UK. In general the USA systems offer advantages in the number of files accessible and the complexity of system facilities; 'home' systems have the advantages of lower communication charges and availability of 'help desk' facilities.

	DIALTECH	DIALOG	INFOLINE	ORBIT	BLAISE	BRS
Host Computer	Italy	USA	UK	USA	UK	USA
Coverage back to	1969	1970	1972	1970	1965(a)	1970
Total Databases	16	*c.* 100	(8)	*c.* 50	19	20
Up-time Days/Wk	M–F	M–S	M–F	M–S	M–F	M–F
Up-time Hours/Wk	47½	114	50/120(b)	111	39½	60
Network	ESANET	TYMSHARE	INFOLINE	TYMSHARE	BLAISE	TELENET
No. of Nodes in UK	1	1	10	1	7	1
Assistance	Help Desk	Rep	Help Desk	Rep	Help Desk	Message
Training	Frequent sessions	Frequent sessions	File directed on-site	Frequent sessions	Frequent sessions	Intermittent sessions

(*a*) *As original CBAC Sections = 1–5 of CA. Amplified in 1975 and 1978 with other CA Sections.*

(*b*) *System available outside 8 am–6 pm London time but without Help Desk or Systems assistance.*

TABLE 2. *On-line service features (July 1979)*

Table 3 summarizes the cost factors. It is in practice very difficult to make a meaningful comparison between the various systems. Since differing system facilities will dictate differing strategies, the time of search for the same topic on different systems will vary. A higher cost per connect hour on system A versus system B does not, therefore, necessarily mean a higher cost of search for any given topic on system A. Charges per thousand characters transmitted on the US systems are an added cost which can easily be overlooked and is difficult to estimate. Assuming a thirty character per second terminal and transmission rate of 25 per cent, character cost per hour is about £32. Printing charges per page rather than per reference give scope for obtaining short format prints at low cost. All systems offer either discount schemes or bulk rates so that high use results in lower cost per search.

Table 4 deals with system facilities. All systems allow term selection, simple

	DIALTECH	DIALOG	INFOLINE	ORBIT	BLAISE	BRS
Telecommunications						
Local Phone to node	?	?	?	?	?	?
*Connection Charge (one-off)		£25.00		£25.00		£25.00
*Fixed per User ID per year		£20 00		£20.00		£20.00
Network	£13.44		£4.00		£4.00	
*Duration Charge/hour		£6.00		£6.00		£6.00
*Volume Charge/ 10 segments (e)		£0.04		£0.04		£0.04
* International Packet Switching System (IPSS)						
Host Systems: Connect + Royalty/hr						
CACON	£22.18	£17.50		£30.00		£17.00(a)
CACON/CASIA	?	£22.95	£32.00	?		£29.40
CBAC (Toxline)					£47.50(b)	
CIN		£30.00		£35.00		
Patent Concordance		£22.95				
Print						
Per Accession Number	£00.00	£00.02	(d)			
Per Reference (CACON)	£00.06	£00.04	(d)	£00.06		
Per Reference CACON/CASIA)		£0.085	(d)	£00.06		
Per Page					£00.09(c)	£0.085
Concessions						
Bulk Contracts					√	√
Automatic Discounts	√	√	√	√		

Exchange rate of $2.0 per £1 assumed.

(*a*) *Highest rate of $30.00/connect hour for controlled use of 25 hours/year assumed. Lower rates available for higher contracted usage.*

(*b*) *Highest Tariff (C) of £30.00+ VAT/hour connect + £14.00 + VAT royalty taken. Lower rates available for contracted usage.*

(*c*) *Minimum charge for off-line print = £0.63.*

(*d*) *5p for all except full format; 10p for full format.*

(*e*) *Approximately £4.00/hour.*

TABLE 3: *Costs—CAS derived files/on-line systems/UK (July 1979)*

AND OR NOT logical connection and trailing (right-hand) term truncation. Major differences are:

i Direct contextual definition by context operators without term truncation: DIALTECH, DIALOG;

ii Direct contextual definition *via* context operators with term truncation: BRS, INFIRS;

iii Indirect contextual definition *via* string or sequential searching: ORBIT, BLAISE, INFOLINE.

Group *i* and *ii* systems have more complex inverted search files in that these record document/sentence/word positions for terms in the complete 'text fields'.

	DIALTECH	DIALOG	INFOLINE	ORBIT	BRS	BLAISE	UKCIS(b)
Truncation							
Right-hand	√	√	√	√	√	√	√
Left-hand (direct)	—	—	—	—	—	—	√
Left-hand in string search	—	—	√	√	—	√	—
Chemical Name Segmentation (a)	√	√	√	√	?	—	—
Logic							
Combination by set no	√	√	√	√	√	√	√
Combination by set no and/or terms	—	—	√	√	√	√	—
WITH, ADJ logic	—	—	—	—	√	—	—
Full contextual logic	√	√	—	—	—	—	√
String Searching	—	—	√	√	—	√	—
Truncation with context	—	—	√	√	√	√	√
Printing							
Standard Prints	√	√	√	√	√	√	√
User Specified Prints	—	—	—	—	√	—	—
Tailored Prints	—	√	√	√	√	√	—
Special Features							
On-line Thesaurus	—	√	—	—	—	—	—
No separate dictionary	—	—	—	—	√	—	√
Batch searching back-files	—	—	—	—	√	√	—
On-line reviewing batch results	—	—	—	—	√	—	—
Search save	√	√	√	√	√	√	√
Automatic SDI	—	√	√	√	√	√	√
On-line editing of output	—	—	√	—	√	√	—
Document ordering	—	—	√	—	—	√	—

√ Yes — No ? Not Known.

(a) Program used to break up chemical names into 'significant chemical fragments'.

(b) System given for comparison. Used for batch current awareness service only.

TABLE 4: *System features (July 1979)*

Since the actual word position is held on file the machine can deal directly with requests for precise separation of words.

Group *iii* systems have simpler inverted files holding only document number records. Simple logic, for example A and B, identifies subsets of documents containing A and B. Where greater contextual definition is required the subset of documents obtained by simple logical searching is scanned 'character by character' for specified alphanumeric strings. This latter procedure is a relatively slow machine operation; thus any search involving phrases may be better searched in a group *i* or *ii* type system. Where phrases are not involved, the group *iii* type system may well be faster.

All systems offer 'user aids'. On-line explanations of files and commands can be obtained. SEARCH-SAVE facilities make it much simpler and more economical to run the same search against various files or to run the same search at regular intervals for updating purposes. Several systems offer an automatic updating service. There are, however, charges for saved searches and, for regular updating, the UKCIS batch current awareness service may well prove more economical. Lockheed has put part of the CA Index Guide on to the CACON/CASIA search file. Figure 1 shows a portion of the search file listing around the term petroleum.

REF	INDEX-TERM	TYPE	ITEMS	RT
E1	Petroleoquim		1	
E2	Petroles		5	
E3	Petroleulm		1	
E4	Petroleum (see ?Ignote)		2,020	
E5	Petroleum ether			1
E6	Petroleum jelly			1

FIG. 1: *Expand Petroleum Jelly*

Where there are no postings under the items column (*e.g.*, for the phrase 'petroleum ether') we deduce that the entry is derived from an index guide cross-reference. Where there is an entry in the 'RT' (related term) column the searcher may request a list of related terms thus: ?EXPAND E5. The related term listing gives him the CA preferred term for petroleum ether, that is, the heading under which this material will be indexed in the General Subject Index.

These important controlled concept headings together with other parts of the controlled Subject Index entries become descriptors (DE) in the Lockheed DIALOG system, and index terms (/IT) in the SDC Orbit system.

Table 5 summarizes conversion of the original CAS data-elements into the search fields of the various on-line systems. The proposed UKCIS implementation of CA SEARCH seeks to compress the data as little as possible and retain the leading truncation facility. This is possible in a batch current awareness system where single issues of CA SEARCH will be handled at a time. Where five-year retrospective files are being built, the sheer size of the CA SEARCH file necessitates some measure of file compression. Most systems eliminate trivial

	DIALTECH	DIALOG	INFOLINE	ORBIT	BRS	BLAISE	UKCIS
General Text		√		√	√	√	√
Text	√	√—	(√)	√—	√—	√—	√—
Title	√—	√—	—	√—	√—	√—	√—
Keywords	√—	—	—	—	√—	—	√—
Abstract	X	X	X	X	X	√—	X
Subject Index data	X	√—	—	√—		X	√—
Concept Headings		—	(√—)	—	(√—)		√—
Functional Category		?	—	—	?		√—
Homograph Defn		?	(√—)	—	?		√—
Qualifier		—	—	—	?		√—
Text Modification		—	—	—	(√—)		√—
Substance Index data	X	*	(*)	*	(√—)	*	√—
Heading Parent					(√—)		√—
Substituent					(√—)		√—
Name Modification					(√—)		√—
Functional Category					?		√—
Homograph Defn					?		√—
Qualifier					?		√—
Stereochemistry					(√—)		√—
Text Modification		—		—	?		√—
Line formula		—			?		√—
Molecular formula					(√—)		√—
Registry Number	√	*√	*(√)	*√	(√)	*√	√
Name Fragments					?		√
Molecular formula fragments					?		?

√ *Searchable as such.*
— *Searchable in combined field.*
(√) *Projected, not yet available.*
* *Searchable in separate dictionary file (see Table 6).*
X *Not searchable.*
? *Not known.*

TABLE 5: *CBAC, CACON, CACON/CASIA, Major Search File Elements (Text+Registry Numbers) (July 1979)*

words and word redundancy. All unique meaningful words are retained but context is lost from keyword phrases and/or text modification phrases. In Table 5, the codes used to identify the various fields are given. It is not possible to show in tabular form the finer details of implementation. Most systems retain the controlled concept headings as phrases, for example, 'cathode ray tube', as well as entering the single words 'cathode', 'ray' and 'tube' in the general text

	DIALOG	ORBIT	BLAISE	INFOLINE
Name	CHEMNAME	CHEMDEX	CHEMLINE	CAR(a)
Source	CASIA/IG/+	RNF	RNF	RNF
No Compounds	628,000	521,072	c. 250,000	(?)
Current % of Total Registry	16%	13%	7%	(?)
Selection	(b)	(c)	(d)	(c)

(*a*) *Chemical Registry Name File.*
(*b*) *Compounds indexed twice or more since 1972.*
(*c*) *Projected to include all compounds from 1972 onwards (2 million +).*
(*d*) *Presence in TOXLINE/TOXBACK.*

ACCESS POINTS	DIALOG	ORBIT	BLAISE	INFOLINE
Registry Numbers	√	√	√	(√)
Alternative Registry Nos	√	√	√	(√)
CA Systematic Names	√	√	√	(√)
Heading Parent	√	√	—	(√)
Substituent	√	√	—	(√)
Name Modification	√	√	—	(√)
Stereochemistry	√	√	—	(√)
Name Fragments	√	√	√	(√)
Non-systematic Names	√	√	√	(√)
Name Fragments	√	√	√	(X)
Ring Data	√	√	√	(X)
Periodic No/Group No	√	√	X	(X)
Other screens	2	27	X	(√)
Molecular Formula	√	√	√	(X)
Formula Fragments (Not H)	√	√	√	(X)
Formula Fragments (Inc. H)	X	√	X	(√)
Total Mol. Form Fragments	X	X	X	(√)
Elements Present	√	√	√	(X)
Non-carbon count	√	√	X	(√)
Non-hydrogen count	X	√	X	(X)
No 'Dot Disconnects'	X	√	X	(X)

√ *Searchable as such.*
(√) *Projected. Not yet available.*
— *Searchable in combined field.*
X *Not searchable.*
? *Not known.*

TABLE 6: *Chemical Substance Data Files (Chemical Dictionaries) (July 1979)*

dictionaries. For all other fields, only single words are stored. Selecting a phrase therefore automatically limits one to searching concept headings. The SDC innovation in the combined CACON/CASIA files of retaining qualifiers and text modification with Registry Numbers is potentially very useful since in this way the structure of the Chemical Substance Index entry is retained. In all systems, the best strategy for maximizing RECALL is to search at the broadest level possible, that is to search for as few concepts as possible and to select single terms from the basic index. Since CAS material is only partially thesaurus controlled, any concept included in the search must be adequately expanded, *i.e.*, synonyms, abbreviations and grammatical variations must be catered for. Where the results of this initial broad approach prove unsatisfactory, then the use of specified search fields (*e.g.* TI) or the refinements of contextual logic or string search can be brought into play.

Finally, Table 6 gives details of the various chemical dictionaries. Since no on-line dictionary is as yet comprehensive, these should be treated as SEARCH AIDS. The simplest dictionary search consists in entering with a known synonym, retrieving a record from the dictionary and printing it to obtain the Registry Number of the compound. This is then entered as the search key for the compound in a bibliographic file. This type of dictionary searching can be done by those with minimal chemical knowledge. The on-line dictionaries also offer scope for carrying out much more complex procedures. CA Systematic Nomenclature fragments, molecular formulae and ring data offer the potential of identifying specific compounds or groups of compounds with similar substructures. Substructure Searching *via* Nomenclature in these complex dictionaries is not straightforward. Appreciation of chemical nomenclature is needed to select an appropriate search strategy in the first place and to interpret the result in the second place. However, the on-line dictionaries do offer the possibility of selecting systematic name fragments and linking them together using the logical facilities offered by the system in question. This in some cases may be easier than identifying the exact HEADING PARENT for the compound—the heading under which the compound will be found in the printed Chemical Substance Index. A very useful description of the essentials of CA Systematic Nomenclature is given in Appendix 4 of the 1977 *Index Guide*.[8]

I conclude with some decisions which may have to be taken regarding machine-based retrieval:

Is it necessary to use machine-based searching?
Those with ready access to Chemical Abstracts Printed or Microform Issues and Indexes already have at their disposal all the data held in the CACON/CASIA file. The advantages offered by machine searching are:

speed of access;
capacity for searching all text words in the file and not just those at the beginning of index entries;
ability to search on elements such as address of work, document type, coden, for which there are no printed indexes;
Substructure Search *via* Nomenclature facilities.

Machine searching, therefore, represents a valuable alternative mode of reference retrieval.

For those without access to the printed or microform products, machine searching offers a means of using CAS material.

Which on-line system should be used first?

It is very difficult for someone relatively unfamiliar with the field of on-line searching to make this choice on the bases of file differences such as those indicated in Tables 5 and 6. The major factors affecting the choice between the various systems are likely to be:

file mix. Does any one system offer the range of files suitable for answering the type of query commonly posed by the organization in question?
costs. Does any one system offer any cost advantage for the organization in question?
advice/training. Are there adequate provisions for obtaining assistance and training when embarking on the use of a particular system?
existing system expertise. Is there anyone in the organization with expertise in any of the systems in question?

Once operators are familiar with the use of one on-line system, they usually find it relatively easy to attain expertise in other systems. This is so because the principles are much the same throughout all systems and it is only details of conventions and format which have to be learned. 'Brushing up' on these details is usually done relatively easily by using guides provided by on-line suppliers.

How to choose between on-line or manual searching for a given topic?

This question is dealt with clearly and practically in a paper by S. Johnson,[9] which states, 'a detailed knowledge of the different entry points available in both (printed and machine-readable) forms and of the layout of the printed indexes is obviously vital to make an intelligent choice between the two procedures'.

It is probably easier for someone unfamiliar with Chemical Abstracts Service material to obtain results for a given topic by using machine-based services. However, to obtain *good* results at the least cost from either procedure, and hence to make an intelligent choice between procedures, a fairly detailed knowledge of the search base is essential.

How to choose between alternative on-line systems?

In practice, because of the variability in files, time spans and file implementation offered, it is unusual to be faced with a straight choice between the same search bases on a variety of systems.

Any slight advantages offered by any one of these systems would be very easily offset by 'operator' characteristics. For example, an efficient ORBIT operator would be ill advised to use DIALTECH to avoid paying character charges since his reduced speed in preparing the search and using an unfamiliar search language might well lead to increased costs. This latter consideration points up the importance of search expertise. The 'best' is obtained from Chemical Abstracts material (and any other search base) when the searcher is able to look at a topic and then quickly choose the most suitable mode of searching, choose the most suitable search strategy, and efficiently use whatever tools are involved.

The ideal searcher for chemical subjects therefore would have:

chemical background (degree or diploma level);
knowledge of the major printed secondary sources in chemistry;
knowledge of the range of computer-based services;
detailed knowledge of at least one on-line system;
ability to develop economic search strategies;
ability to use a terminal efficiently.

It would seem, therefore, that one of the most important factors in ensuring return on capital in technical information retrieval is the training and expertise of the personnel involved.

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* Available from UKCIS, University of Nottingham.

DISCUSSION

What follows is an abbreviated version of the discussion which concluded this Evening Meeting:

Q. Is there a way of finding out exactly how the CA Names are constructed?

A. Yes. The best place to look is in Appendix IV of the CA Index Guide. This is the best source of information on CA Indexing policy as a whole. At first glance, Appendix IV is a little formidable. The vital piece of information is that the Heading Parent (or index entry point) is heavily dependent on the functional groups present. A hierarchical list of functional groups is given in Appendix IV.

It is not necessary to be an 'expert' on CA nomenclature to be able to make use of systematic names. There are one or two 'short cuts' which may be adopted:

> If you have a known compound and you want to find similar or related compounds, you can first find the dictionary record for the known compound. The Registry Number is not useful for finding related compounds since Registry Numbers are unique for a compound (even down to its stereochemical, isomeric or isotopic form) and there is no inherent meaning in the Registry Number. However, the Systematic Name can be considered as hierarchical. Unless more important functional groups are introduced, similar compounds will have similar Heading Parents. We can often, therefore, use parts of a known systematic name to find related compounds.
>
> Even if you are unable to assign a full CA Systematic Name to a known structure, ability to decide on the Heading Parent and names of significant groupings in the molecule will allow a search to be made on the basis of name fragments.
>
> Molecular formula plus one or more significant name fragment(s) is a very fruitful approach for pinpointing required compounds.

Q. How can I search for all polymers containing a particular monomer: the 2-hydroxy-propyl ester of 2-methyl-2-propanoic acid?

A. In Chemical Abstracts, systematic names are presented as follows:

2-propanoic acid,	2-methyl-	2-hydroxypropyl ester	
HEADING PARENT	SUBSTITUENT(S)	NAME MODIFICATION	STEREOCHEMISTRY

Polymer names are built from constituent monomer names followed by 'POLYMER WITH . . .' in the Name Modification field.

So we can search for:

a Heading parent = 2-propanoic acid
b Substituent = 2-methyl-
c Name Modification = 2-hydroxypropyl ester
d Name Modification = polymer.

Since molecular formulae of polymers are presented in dot-disconnected form, we could also search for:

e Molecular formula fragment = $C_7H_{12}O_3$.

Selections a, b, c, d, and e could be linked by AND logic. This should give the group of polymers required.

The SDC CHEMDEX dictionary also allows us to search for 'Number of dots' in a dot-disconnected formula. So this allows us to specify the number of components required in a polymer or mixture. For example, if we required terpolymers from the above group we could also specify:

f DOTS = 2.

Q. Can we assume that every compound named will have a Registry Number?

A. That is not a valid assumption. Here we are tangling with CA Indexing policy. Let us consider the example of a searcher who wants papers on a particular polymer produced from specified monomers. He reasonably chooses to search for the Registry Numbers of the monomers plus the Registry Number of the polymer, but obtains very few answers. The reason for this is that to minimize the size of indexes, CAS do not index *common* reagents, catalysts or monomers. Thus the effective strategy is to use names for the monomers and Registry Numbers for the products.

Q. Does that mean that we can't rely on Registry Numbers?

A. I wouldn't say so. Registry Numbers are very concise and useful search keys. If the compound has been *indexed*, then the Registry Number will be present and important concepts and compounds are indexed unless policy dictates otherwise. The vital thing to know is CAS indexing policy as regards the subject area you are interested in.

Q. I'd like to ask about the use of section codes in searching. As I understand it, the policy is that section codes are used as synonyms for broad topic words. Can you explain something about the policy used for allocation of section codes as distinct from descriptors which mean the same thing, and is the actual section code name repeated?

A. No, it isn't. Each paper is assigned to a section for printing purposes. This section should reflect the major emphasis of the paper. The paper may also be cross-referenced to other sections, and these cross-references can be useful in on-line searching. You are able to search for all papers assigned to a particular section or cross-referenced to it. There are also ***sub-sections*** which again may be searchable on-line. These are also print ordering features and each section has a fixed list of possible sub-sections. These are detailed in the CA Subject Coverage Manual. As regards keyword indexing, an item assigned to Section 4 (Toxicology) will not be indexed with terms such as 'toxicity'. Hence the advice to include pertinent section numbers as well as terms when searching CA Condensates. This policy does not apply to entries for the General Subject Volume index.

Characteristics of brand names used in marketing information products and services

John Myers

Solon Consultants, London

Charles Oppenheim and Stephen Rogers

Centre for Information Science,
The City University, London

218 brand names of microfilm/microfiche readers, computerized information retrieval systems and on-line databases were subjected to an analysis of their characteristics. They were analysed for the product information they conveyed and for the characteristics of the words employed. It was found that brand names tend to employ meaningless concocted words and that the favoured words begin and end with a consonant. Other features of the words used and differences between the groups of products were noted.

AN UNEXPECTED COMMUNITY of interest exists between, on the one hand, the marketer of consumer or industrial goods and, on the other, the information scientist or librarian. Both in the course of their work want those they serve (customers or users) to be able to separate out with a minimum of effort items or facilities of value to them. In commercial and industrial markets the necessary distinctiveness is often achieved by brands or trade marks and by packaging and labelling—matters which are subjected to intensive research with the aim of improving the naming, presentation, differentiation and promotion of individual products or services. In the information and library field there is a parallel stream of studies on logical, psychological and systematic methods of distinctively arranging and coding documents and document surrogates.

These two traditions of research have up to now had few overt contacts with one another: the citation patterns of the published literature reveal little or no intersection (except in the area of readability research). Yet, in the authors' view, each has something to offer the other: cross-fertilization between these lines of research can bring useful additional insights which are of assistance when empirical solutions are required in practical situations. In this paper our opinion will be supported by a brief study from the information and library perspective. Specifically, we aim to show that services in this field could benefit from research carried out on the marketing of commercial and industrial goods.

Name this service

By way of illustration we propose to take a single (and simple) application of interest to information scientists and librarians—that of giving a service or a

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facility a distinctive identity. It is a problem which many practitioners encounter in one form or another during their professional lives. A commonly occurring example is the choosing of a title for an information or library bulletin. Should it be called, descriptively, an *Accessions List* or an *Intelligence Bulletin*? Alternatively, should some connotative title such as *Briefing* or *Inform* or *Digest* be used? Or instead should the publishers dream up an evocative, perhaps acronymic name—for instance, *SCAN* (*S*ee-*C*learly-*A*ll-*N*ews) or even *QUILL* (*QU*ick *I*nformation for *LL*awyers)?

Much the same problem is encountered by those who produce computer packages or services, or technical products designed to aid handlers of information or documents. No doubt long cogitation took place before the decision-makers settle on marks like *Orbit*, *Blaise*, *Info-line*, *Assassin*, *Lexis*, *Spin* and *Claims*. In all these instances the intention is to establish an identifying descriptor which will become a shorthand way of referring to a service, a facility, or a product of value to the information and library world. The question of immediate interest is whether any guidance on the formation of such descriptors can be obtained from research on the marketing of goods.

The contribution of research

We began by considering theories—there are several[1]—which have been developed to interpret how buying influences or stimuli are transformed into purchase decisions. It is evident from the literature that these theories are not mutually exclusive; and that, depending on the product, different buying influences and behavioural processes may dominate. One of the most pervasive of these theories is based on psychoanalysis; and it is particularly relevant to the present study because it leads to a testable hypothesis that the customer's or the user's response is governed not only by the economic and functional features of the product but also by what are termed 'symbolic attributes'. These are essentially qualities which might be communicated by advertisements or by perceivable characteristics of the product, such as its shape.

This hypothesis has been extensively investigated. It implies that brand image, as a symbolic attribute, has an important influence on customers or users. Interestingly enough, the known facts bear this out: there is experimental evidence that for fast-turnover goods (cosmetics, convenience goods and the like) and some consumer durables (cars, refrigerators, etc.) the brand image is important.[2] For industrial products and services the role of brand image is less well established, but the tenor of informed opinion among industrial marketing specialists is that it is important in this sector as well.[3]

Categorization

Given that the hypothesis seems tenable, we next looked at the ways in which brand names or marks can be categorized. In sum, names can be grouped by answering four main questions. Does the brand convey information about the product, or not? Is any information which is conveyed given *directly* or *indirectly*? Is this information related to the *functions* or *qualities* of the product, or does it generate product *atmosphere*? Is the brand name an existing word or a concocted term?

The principal category comprises the brand names which convey information about the product or service. Product information is regarded as being present when elements of the name describe characteristics of the product. An example of *direct* product information is *Sociological Abstracts* which unambiguously conveys the purpose of the publication to those in the market for it. The clarity of such descriptors raises the question of why decision-makers often prefer instead brand names which convey product information *indirectly*.

In the case of products the freedom to choose *directly* descriptive brand names is constrained by the laws which govern trade marks. The law in the UK and in many other countries does not allow a monopoly right for a descriptive trade mark (such as *Punched-card Index*). A mark of this type may still have some protection in Anglo-Saxon legal jurisdictions from the common law provision inhibiting 'passing-off', but this protection is weaker than that afforded by a registered trade mark. Thus, firms seeking a distinctive name for their product are more likely to adopt a mark which will be accepted for registration—and which will, therefore, protect them from competition by suppliers of similarly named substitutes.

In the UK the same constraint does not apply to services, which cannot be safeguarded at the present time by a registered trade mark. This would suggest that British suppliers of services offered only in the domestic market will not take trade mark law into account. However, in many other countries services are offered trade mark protection, so that British suppliers marketing services internationally are likely to be influenced in their choice by the possibility of protecting the mark abroad.

Thus, many originators of brand names can be expected to favour conveying product information *indirectly*—so that they can register the mark. Probably for such reasons names such as *Portaview*, *Magnafiche* and *Visoprint* have been created for microform systems: they are convenient and uniquely identifiable brand names which convey information about the product.

In practice, the convenience and memorability of easily understood brand names is such that they are often adopted for services and computer packages in circumstances where the descriptor cannot be protected under the trade mark laws. Many of the names which are chosen are valued because they give immediate connotations with the *functions* of the product or service. Good examples are the brands of microform equipment already referred to, and systems or databases such as *Browser*, *Dialog*, *Chemname*, *Epilepsyline* and *Geoarchive*. In other cases, the *qualities* of the product or service may be conveyed by the descriptor—as, for instance, *Promt* (the Predicasts on-line database on markets by sector). Here, it is clear that the name implies that the facility is available when the occasion demands it: the name conveys the quality of timeliness.

Another approach is to adopt a mark which more generally evokes *product atmosphere* in a particular market sector. Thus, *Spin* is the name assigned to a physics on-line database—with subject connotations to physicists who come across the concept in their work, as well as doubtfully useful associations with the dynamics of spinning and searching databases.

The residue of marks which convey neither information nor atmosphere include such mouthfuls as *UKCIS*, *NTIS*, *Aslib*, *Marc*, *LISA* and *Laser*—shorthand forms which, if they are to create customer or user response to them as brand names, have to create their own patterns of associations. Similarly, there are names such as *Riot* or *Assassin* (a package which presumably cuts to the heart of information problems), where any connotations are probably contrary or obscure, so that the image-building exercise has to correct adverse initial impressions and to develop an independent set of associations among those in the market.

Although the categorizations we have proposed are of the 'fuzzy set' variety—boundaries cannot be drawn precisely and the categories are not necessarily exhaustive—nonetheless the breakdown is useful in drawing attention to the ways in which names are concocted.

The appearance and the sound of brand names

In studies of brand names the appearance or construction of them has been analysed on the basis of length (the number of letters), frequency counts of individual or coupled letters, and the pattern of vowels and consonants in the name. The sound of brand names has been investigated in terms of 'phonemic symbolism', which is an interesting approach—even though it is not yet one of clearly demonstrable practical value.[4,5,6]

Briefly, a phoneme is a separable sound. The purpose of a phonemic symbolism analysis is to identify the connotations which the sound has among many auditors. It is a technique which attracted considerable attention in the 1960s. Since then not very much has been published—either because no fruitful lines of further investigation have been identified or because the work has submerged into the limbo of proprietary research.

What is known from the published studies is that people seem to associate certain sounds with characteristics such as size, brightness, movement, warmth and pleasantness.[7,8,9] There are comparable associations for other sounds with less attractive qualities. The main limitation is that the connotations seem to be culture dependent, so that monoglot speakers of unrelated languages do not agree on the connotations of a given phoneme. These conclusions are derived from two groups of studies. In one the investigation concentrates on the reactions of subjects to particular sounds and examines the associations they identify with the sounds. In the other, the focus is on the words: researchers study the common characteristics of synonyms which denote a particular concept. These studies have produced some interesting examples. Thus, physical and temporal distance seems to be conveyed by contrasting 'high' and 'low' vowels.[10] Words signifying 'here' tend to contain the high front vowel 'I' (as in 'with') and words signifying 'there' tend to contain the low back vowel 'a' (as in 'far').

Although such research on phenomic symbolism is fascinating it has not seemingly advanced to the point where it can be applied with confidence to categorize brand names. In principle, the phenomic analysis should be fruitful, as many words which are similarly spelt or sounded often derive from a common root and are, therefore, likely to have comparable associations.[11] But until the practical applications can be demonstrated more clearly, analysis of brand name connotations and structure has necessarily to be confined to semantic and structural features.

Methodology

We analysed three groups of products now commonly encountered in the library and information science fields—microfilm and fiche viewers, computerized information storage and retrieval systems and on-line databases. The brand names were collected from standard sources for these respective products.[12,13,14] Tables 1, 2 and 3 list the brand names found. Examination of the tables

1 PORTAVIEW
2 LENSMAN
3 PROJECT THREE
4 PROTI
5 ECONOMY
6 EASAMATIC
7 VIKING
8 PLANET
9 INFORMANT
10 JUPITER
11 EXAC-TICS
12 MINICAT
13 ECOBRA
14 THREE-FIVE
15 TUSCA
16 MOTORMATIC
17 WIDEOGRAPH
18 MULTI VIEW
19 PLANDALE UNIVERSAL
20 VANTAGE
21 STANDARD
22 QUICK VIEW
23 SPECTRAVU
24 MERCURY
25 AUTO AI
26 EKTALITE
27 MICROSTAR
28 ATLAS
29 SATELLITE
30 ECONOMIST
31 GRADUATE
32 CONSULTANT
33 ASEA
34 VOYAGER II
35 COMET
36 AUTOLOAD
37 RECORDAK
38 SPEEDY VIEW
39 REPORTER
40 MAGNAFICHE
41 UNIVERSAL
42 THREE-FOUR
43 ALOS VISETTA
44 VISOPRINT

TABLE 1: *Brand names for microfilm/fiche readers*

1 BROWSER
2 IDEAS
3 TOOL-IR
4 WELLCOME
5 STATUS
6 LIBINDEX
7 THOR-2
8 ESA-RECON
9 CRIF
10 MISTRAL
11 QL
12 DIMDI
13 GOLEM
14 INFOLINE
15 SCORPIO
16 BADADUQ
17 SPIRES
18 PASS
19 LIS
20 RETRO
21 MED-DOC
22 RIOT
23 ALPHA
24 CAN/OLE
25 BASIS
26 OCLC
27 BIOSIS
28 POLYDOC
29 ORBIT
30 WISE
31 ARIANE
32 DIALOG
33 BIBNET
34 ISIS
35 STIMS
36 QUOBIRD
37 CIS
38 TITUS
39 AGRIS
40 ERDA-RECON
41 PRIMAS
42 NTIS
43 NASA-RECON
44 OVID
45 JURIS
46 BRS
47 CAIRS
48 EXCERPTA MEDICA
49 SIDERAL
50 BLAISE
51 INSERM
52 CYBERNET
53 AQUARIUS
54 COMBASE
55 CTI
56 STAIRS
57 GEOSYSTEMS
58 ENDS
59 BALLOTS
60 ASSASSIN

TABLE 2: *Brand names for on-line systems and installations*

demonstrates the well-known love of acronyms in this area. We suspect that often a suitable acronym is thought up first, and words to fit the acronym come later. We do not know of any literature reporting how acronyms in this field are thought up, but some clearly stretched the ingenuity of their devisors, for example, CLAIMS, the on-line patent database, which stands for Class Codes Assigned Index Method Search.

We carried out the following analyses on the collection of brand names:

Product information: Did the name convey product information and if so, directly or indirectly? If not, did the name convey product atmosphere? Were there any significant differences between existing words and invented or concocted

1 MRIS
2 HISTABS
3 ENERGYLINE
4 LABORDOC
5 ERIC
6 ISMEC
7 IPA
8 TERA
9 ASI
10 TOXBIB
11 ASFA
12 WALA
13 PAIS
14 CDI
15 CAB
16 MAGAZINE INDEX
17 LISA
18 PAPERCHEM
19 CHEMNAME
20 FEDERAL INDEX
21 CBPI
22 CANCERPROJ
23 LIBCON/F
24 F&S
25 FSTA
26 SCISEARCH
27 SAE ABS
28 RINGDOC
29 BIBDAT
30 NASA
31 AVLINE
32 SPIN
33 TADS
34 TRIS-ON-LINE
35 SSIE
36 SOCIOLOGICAL ABSTRACTS
37 SOCSCISEARCH
38 APILIT
39 AMERICA
40 ENVIROLINE
41 ENVIROBIB
42 CANCERLIT
43 CNI
44 CLAIMS/CLASS
45 MANAGEMENT
46 HIGHWAY SAFETY LIT.
47 CIN
48 FGI
49 ETIC
50 LIBCON/E
51 PESTAB
52 MGA
53 OCEANIC ABSTRACTS
54 NEWS/RETRIEVAL
55 PASCAL
56 EPILEPSYLINE
57 PA
58 NICEM
59 GEOREF
60 AGRICOLA
61 P/E NEWS
62 BIOCODES
63 PNI
64 INSPEC
65 FOUNDATION DIRECTORY
66 ELECOMPS
67 PROMT
68 DMMS
69 CIS
70 ACCOUNTANTS' INDEX
71 GEOARCHIVE
72 NYTIB
73 GRANTS
74 CRIS
75 APTIC
76 PSYCABS
77 EIS
78 ABI/INFORM
79 INIS
80 CLAIMS/CHEM
81 CAC
82 BIOSIS PREVIEWS
83 PTS
84 CASIA
85 METROCASTS
86 LLBA
87 APIPAT
88 TOXLINE
89 ART MODERN
90 MANAGEMENT CONTENTS
91 CRECORD
92 TSCA
93 POLLUTION ABSTRACTS
94 COMPENDEX
95 POPINFORM
96 WPI
97 ECEA
98 CLAIMS/GEM
99 PIRA
100 AIM/ARM
101 MARC
102 CAAN
103 CBAC
104 CATLINE
105 SDILINE
106 HEEP
107 CHEMLINE
108 MARKET ABSTRACTS
109 EMIC
110 MEDLINE
111 TULSA
112 PESTDOC
113 METADEX
114 CHEMDEX

TABLE 3: *Brand names for on-line databases*

words? In the analysis we took the position of someone encountering the brand name for the first time. Thus NTIS was regarded as *not* conveying product information although, nowadays, to a practitioner it would do.

Construction analysis: The number of letters in each word was noted, and the most frequently occurring word-lengths recorded. All the words were reduced to binary letter formula in which A represents vowels (including Y) and B all consonants. The formulae were then compared to find construction pattern frequencies. Finally, first and last vowel/consonant combinations were noted and their frequencies calculated.

Results

Product information

The results are summarized in Table 4. We also carried out an analysis of word types in the existing word sample, *i.e.*, were they nouns, adjectives or proper names? This analysis demonstrated that nouns are far more popular than adjectives or proper names for brand names. The main result from Table 4 is clearly the popularity of concocted words not conveying anything about the product (*i.e.*, meaningless concocted words) for computerized systems and for on-line databases. In contrast, microfilm readers tend to have brand names conveying product information or atmosphere. The reasons for these differences are not clear to us. We suspect that this pattern may indicate that makers of

	MICROFILM READERS	COMPUTERIZED INFORMATION RETRIEVAL SYSTEMS	ON-LINE DATABASES
CONVEYING PRODUCT INFORMATION			
Directly:			
Existing	9%	3%	14%
Concocted	20%	7%	24%
Indirectly:			
Existing	18%	9%	7%
Concocted	2%	7%	1%
TOTAL	49%	26%	46%
CONVEYING PRODUCT ATMOSPHERE			
Existing	11%	13%	1%
Concocted	2%	—	6%
TOTAL	13%	13%	7%
NOT CONVEYING ANYTHING			
Existing	19%	24%	5%
Concocted	19%	37%	43%
TOTAL	38%	61%	48%

TABLE 4: *Product information in brand names*

microfilm systems may want their products to be regarded as functionally familiar developments, whereas the generators of computer-based products may seek to emphasize the innovative qualities of their ventures.

One unexpected finding is that computerized information retrieval systems, which cannot get registered trade mark protection, use direct description for their names to a limited extent—no more than 10 per cent. In contrast, the brand names of microfilm readers, even though they can be and often are the subject of registered trade marks—which preclude the use of descriptive terms—involve a far higher proportion of descriptive brand names (29 per cent). Again, this may indicate the relative preferences of the suppliers for familiar or innovative brand names.

Construction Analysis

The results of this study are shown in Table 5. Analysis by the AB formula was only carried out on the words comprising the most popular length for each product, *i.e.*, nine letters for microfilm/fiche viewers, five letters for computerized systems and installations and four letters for on-line databases. No pattern was found for the brand names of microfilm viewers, but for computerized systems and installations BABAB was found in 47 per cent of the sample and

NUMBER OF LETTERS	MICROFILM READERS	COMPUTERIZED I.R. SYSTEMS	ON-LINE DATABASES
2	0	3%	2%
3	0	8%	16%
4	15%	20%	22%
5	17%	23%	8%
6	8%	20%	13%
7	17%	14%	12%
8	15%	11%	7%
9	19%	0	11%
10	8%	2%	6%
11	0	0	2%
12	0	0	2%

TABLE 5: *Word lengths of brand names*
(If a name comprised more than one word, the words were analysed separately. Figures may not add up to 100 *per cent because of rounding up)*

	MICROFILM READERS	COMPUTERIZED I.R. SYSTEMS	ON-LINE DATABASES
A . . . A	8%	9%	8%
A . . . B	19%	17%	20%
B . . . A	29%	17%	25%
B . . . B	44%	57%	47%

TABLE 6: *First-last letter patterns*

for on-line databases BABA and BBAB were each found in 17 per cent of the words.

Consideration of the first–last letter patterns for all the brand names showed something more definite. As Table 6 demonstrates, B . . . B is consistently the most popular pattern for all the products, and that the next most popular pattern is B . . . A. A . . . A is always the least popular pattern. In a reference study[15] of 500 brand names of consumer and industrial products, the most commonly encountered structure was BABAB. Other commonly encountered structures were BABBAB, BABBA and BABA.

Conclusions and implications

How much attention practitioners will pay to such systematic analyses depends on the importance they attach to the marketing of information and library services. There are several possible reactions. One would favour an aggressive marketing approach to an information or library service—an approach which aims to differentiate it sharply from similar services in the minds of users. It is a strategy for innovators whose preference will be for a name which is *unlike* the names of those other services which might be competitive—perhaps of a concocted and non-descriptive type. To be consistent the promoters of such a new service would also seek to develop an image, a logo, a house style, a scope or perspective, and a presentation which all emphasize the unique qualities of their service. This strategy manifestly involves much greater investment in educating users and familiarizing them with the new concept.

The defensive marketing reaction could almost be described as the 'me too' approach. In other words, to retain credibility practitioners may want to supply a service with which users will already be familiar and which thus fits in naturally to an existing slot in the market. In this instance the naming and presentation of the service should be *like* the names adopted by other successful services—perhaps a descriptive name with familiar associations following the regular BABAB structure. Similarly, the image, logo, style, perspective and promotional strategy would all emphasize the qualities the service has in common with other well-tried services.

The third possible reaction is that professional life is too busy for marketing approaches—which in practice often means a non-aggressive differentiation of the service from successful services. The *Libr. Bull.* will continue to appear in a compressed format which imposes severe demands on the hard core of readers—the few whose needs and enthusiasms are great enough to surmount the difficulties imposed on them. The approach is comparable to placing a library on the seventh floor without a lift: anyone who is keen and fit enough to make the climb evidently has a requirement worthy of attention. This negative approach to marketing may keep demands on a resource-limited service within bounds, but it opens the door to innovations by other suppliers with an aggressive marketing approach. As a strategy it seems to run counter to the concept of a *service* which in principle should be attuned to the perceptions and needs of those it serves.

Against this background the method of analysing assigned names has some value because it provides a systematic basis for decisions to market information or library services aggressively or defensively. Thus, our analysis has come full circle. We began with a simple problem, which is usually solved empirically (probably with the aid of Roget's *Thesaurus*). We then showed that the problem can be approached in a structured way, by drawing on research studies relating to the marketing of industrial and consumer goods. The structured approach applied to 218 brand names in the information and library field revealed that, consciously or subconsciously, the originators of these names seem to have adopted different marketing strategies—aggressive, defensive, or merely negative.

Where brand names are created without reference to the appropriate marketing strategy there may be incongruence. In other words a name and a style may be employed which reflect an aggressive marketing intent when the service is fulfilling a defensive marketing role—or *vice versa*.

The obvious corollary is that the best starting point is a definition of the objectives and the strategies for a service which can then be reflected in its presentation to users.

Readers interested in pursuing the subject of brand names are advised to read some of the references[16–20] cited in the bibliography.

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On-demand publishing

Alan Singleton

Primary Communications Research Centre,
University of Leicester

'IT HAPPENS NOT infrequently, that books of great value cannot be published in the usual way, as the very circumstance which ought to recommend them, viz., their rare or peculiar learning, narrows proportionally the limits of their circulation. Works of great merit have often been published at a loss both to author and publisher; and previous to the establishment of the printing clubs, books of a peculiar kind were rarely issued, and our literary and scientific progress seemed to be unusually dull.'[1]

In this way the Reverend Abraham Hume, in 1853, presented a contemporary problem. Similar problems have beset the publishing of scholarly works in more recent times[2] and particularly the mid to late nineteen seventies, as dealt with by Meadows[3] and Smith,[4] for example. Hume goes on to describe the printing club, which was a type of publishing closely allied to subscription publishing, where a limited number of copies are made available to members who constitute a guaranteed market—a solution which, theoretically at least, is still open to us now. Book clubs for popular works have been successful in recent years, but we have seen no corresponding interest in such clubs for scholarly works. However, our purpose in this article is to examine an alternative solution to Hume's problem: *on-demand* (OD) publishing.

On-demand

Imagine a system for producing scholarly works, which, for any title, involves little risk or financial investment, no storage costs for books awaiting sale, nor stock write-offs for those which wait in vain. Furthermore, imagine a system in which titles never go out of print. Such are the claims sometimes made for OD publishing. Were the claims substantiated, we might expect publishers for all types of books to be extremely interested, but particularly for those books which are not financially viable in the conventional system.

However, producing books, or other scholarly material, is not the same as publishing them, and not all costs in publishing are removed by the adoption of an OD manufacturing technique.

In essence, OD means simply the production and supply of copies of a work in response to orders, or demand, one by one (or perhaps few by few), rather than supply from a pre-produced stock of copies. It is thus a change in manufacturing technique and has, typically, meant the supply of photocopied works from either a microform or hard-copy master. If this were the only change, consideration of the merits of OD would reduce to a discussion of the economics of production at various print-runs, and a comparison of marginal costs in photocopying, microform copying and conventional printing. However, OD

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publishing usually assumes other changes, some of which are open to conventional systems, and some of which alter the nature of the publishing process.

OD systems do exist, although not all are referred to as publishing systems. In this article we examine the characteristics of some of these systems, and wish to argue that a change from conventional to OD involves an inversion of the publishing process. To change the metaphor, conventional and OD systems stand near opposite ends of a spectrum, with publishing at one end and library/information service operation at the other. The distinction between these systems could eventually disappear. However, at least as far as scholarly books are concerned, special steps may need to be taken if an OD system is successfully to assume a publishing role.

The assertions of the last paragraph are somewhat obscure and need substantiation and clarification. Therefore, we look at some OD systems and their relationship to conventional systems.

Keeping in print

Let us imagine that a publisher published a book six or seven years ago, and did an initial printing of 2,000. After high initial sales there is now a stock of, say, fifty copies, after sales in the last full year of sixty copies. The publisher now has a problem. He has stocks for perhaps a further year, and if he does not reprint and cannot produce a new edition, the book will go out of print. In the conventional system, the minimum print-run for a reprint will need to be fairly high, say, 500, so that the unit cost of production will not be so high as to price the book out of the market. However, at current rates of sale, it might take ten to fifteen years to recover the investment made in reprinting. In such a situation, a publisher would most often decide that the money would be better spent on new books where there is the prospect of a quicker return.

The potential purchaser is then restricted to obtaining the book on loan from a library. In a minority of cases, over a period of time, a sufficient total demand may become apparent for either the publisher, or another organization, with the publisher's agreement, to produce a reprint. There are quite a large number of commercial reprint companies—Linneaus, Kingsmead, Johnson, Laffite, Minerva, Gerstenberger, Porcupine Press, etc.

In such cases, OD offers a solution to the publisher's problem. If someone can produce single copies of reasonable quality at reasonable cost, then titles can be kept in print indefinitely. Where a publisher has (as he will hope to have) this problem with a very small proportion of his list, it is unlikely to be economical for him to make the arrangements for producing single copies (some publishers do undertake this for their own work, putting it into microfiche form.)[5] But a publisher who *specializes* in this kind of work, keeping a long list of titles and producing single copies using the latest reprographic techniques, may well be able to accommodate new titles with no significant increase in investment. There are commercial companies which do provide this facility.[6,7]

Since the origination (*i.e.*, typesetting) of the book has already been carried out and paid for in the first printing, the question about this type of OD system is basically reduced to one of quality and economics of reprographic technology. For example, in the past it was fairly common for the OD publisher to produce a master copy of the book in microfilm, store that, and produce hard-copy versions OD from the film. Now, often, because of advances in reprographic technique, the initial microfilm stage is bypassed and an original book (binding removed) is used as the master.

If the conventional publisher is persuaded that the quality and price of the OD product are reasonable, so that they will not damage his reputation, there is little to be lost, and something to be gained, by allowing the OD publisher to produce the works under a royalty agreement.

Republishing old works

In some cases the line between republishing and keeping in print is difficult to draw. Under the heading of republishing we are mainly referring to old works (sometimes centuries old), normally out of copyright as well as out of print. This has been a growth area for the micropublishers, *i.e.*, those publishing in microform. The vast majority of these publishers, at least in the UK, produce and sell microform in single OD copies (see a 1975/6 survey by Nash[7,8]). Thus, it is not surprising that the term on-demand has become almost inextricably linked with microform.

The economics of production are similar to those of keeping in print, *i.e.*, technology is such that the cost of producing single copies enables the publisher to offer the work at a price sufficient to attract a limited market. Note that, again, the typesetting, or even script, has already been done by the original printer/publisher.

Micropublishers have had a particular fondness for publishing collections in this way. Obviously, if libraries can be persuaded to buy microform copies of large quantities of books, the micropublisher reduces the risk of investing money in a microfilming procedure of individual books with the possibility of no return from orders. Clearly, also, the prospect of having complete collections available may be attractive to libraries. Such collections are sometimes established by reference to authoritative bibliographies, or are sometimes created by the micropublishers.

A quick look through the catalogues of some micropublishers provides a number of items to illustrate the kinds of work in this category:

> Early English Books 1475–1640—21,000 titles—total price (March 1978): $56,100 (University Microfilms);
> British and Continental Rhetoric and Elocution—16–19th century—117 titles: $555.00 (University Microfilms);
> Classic Literature on Invertebrate Paleontology (Oxford Microform Publications);
> English Linguistics 1500–1800 (Scolar Press).

Micropublishing and/or OD publishing of this material, since it normally involves photographic reproduction, will preserve something of the original form of the work (typeface, page layout) although it is hardly likely to appeal to bibliophiles who may be interested in the original binding, paper, etc.

Unpublished historical material

Another major area for microform publishing, very largely OD, is that of hitherto unpublished material. Again, the limited potential market, or the sheer bulk and form of the original material, precludes conventional publishing.

Under this heading we might put such things as the personal papers, letters and writings of historical figures, historical records and registers of particular geographical areas, and, for this century, scripts of radio or television news bulletins, or plays or other broadcasts. One can readily see that such works can be a rich source for historical or social research. The micropublisher's role is to seek out and select such material and to make it available to a world-wide audience—and to make a profit on it. Building up lists in this field can be quite an exciting and creative task. Again, glancing through the micropublisher's catalogues provides numerous examples:

Manuscripts and Papers of John Keats—4 reels—£52 (E.P. Microforms);
Correspondence of John Flamsteed (Royal Society)—1 reel—£13 (E.P. Microforms);
Sotheby's Annotated Sales Catalogues, 1734–1970—$9,800 (University Microfilms);
Source Materials in the Field of Theatre—22 reels—$760.00 (University Microfilms);
Complete State Papers Domestic of the Reigns of Edward VI, Mary I, Elizabeth I, James I—1547–1625—£2,900 (Harvester Press).

Back-runs of serials and newspapers

Chadwyck-Healey has pointed out[6] that the micropublishing of *current* issues of some newspapers and magazines can be extremely profitable. This is not OD in our sense, since the publisher services a subscription list which is not expected to fluctuate greatly from year to year and may involve the production of very many copies.

Back-runs of periodicals *may* be produced on demand particularly if microform is used. Many publishers carry (or hand to back-number agents) conventional stocks of back-runs, *i.e.*, produced when the first printing was carried out, but they (or their nominated agent) may also offer microform. For learned journals at least the latter is very small business.

Journal articles

Here we consider the OD republishing of journal articles in almost the same way as that for books.

The simplest form of OD here involves the production of copies of separate articles from back-runs of periodicals. Typically, a micropublisher will do this from microfilm masters by agreement with the original publishers. Whether OD copies are produced from microfilm or hard-copy may depend on whether a microfilm version already exists, the comparative costs of producing hard-copy from microfilm or other hard-copy, coupled with the comparative storage costs of back-runs in each form. A publisher or micropublisher offering this service will promote it in standard ways (direct-mail leaflets, etc.).

This type of service immediately brings to mind personal or library photocopying of articles from journals. This is certainly on-demand, but is it republishing? The criteria for establishing this are not clear. Does it depend on whether there is publicity for (or marketing of) the service? Does it depend on the overall scale of the operation (from small library or personal copies up to operations of national libraries)? To explore such contentious questions fully would involve the review of an already copious literature on the effects of library photocopying on journal sales.[9,10,11] However, when placed in this context, it is at least easy to see why some *publishers* refer to this practice as republishing. We first see here a link between OD and library operation.

Synopsis journal articles, depository publications, etc.

With rising printing, producing and distribution costs, it is not often possible to publish the detailed documentation (*e.g.*, graphs, tables, etc.) which may accompany a scholarly paper. Thus, some organizations have adopted schemes of depository publication where all such supplementary material may be available OD, from either the publisher or some centralized source. For some time, the British Library Lending Division (BLLD) has offered to act as a depository for such schemes,[12] as has the American Society for Information Science[13] and similar, but larger, schemes are well established in the USSR.[14]

Somewhat similar is the dual journal concept, whereby some form of summary (in some cases an abstract, or often a more extended synopsis) is produced in a conventional form, and the full text back-up is available either in microfiche or miniprint.[15] In some cases the back-up full text is available on subscription only, but often full text is available OD.[16-20]

We have now shifted from republishing to *first* publication of new material OD. Normally, for journal articles, the selection process of what is, or is not, to be published nearly always rests with the scholarly community. That is, the publisher does not have to make a publishing decision on each item, but only on the journal as a whole. Nevertheless, this turns our attention to the author, whose participation is needed if such schemes are to work. Clearly, Hurst[21] is aware that authors may fear that a depository scheme is inferior: 'Since such articles carry the imprint of the Journal of Modern History, the author is afforded the distinction of being "published".' Whether or not a synopsis publication would be seen as an inferior form of publication is, of course, of major concern to the publisher. To avoid this, it would seem wise not to mix full-length papers and synopsis papers in the same journal, but instead to ensure the high status of an all-synopsis journal.

New systems

The last two sections have dealt, briefly, with serials, newspapers and journal articles. We ought also to mention the major technology related developments which can affect this type of publishing, and be thought of as OD publishing.

Four years ago, Fenaughty[22] proposed ways in which the computer and associated techniques could make OD publishing a reality for reference works, magazines and news magazines. As he said, the development that makes OD publishing feasible is that 'economies of scale are eliminated altogether. The technology will provide a situation, for example, where the cost of printing thousands or hundreds of thousands of magazine copies that differ from one another will be no greater than the present cost of publishing the same number of copies that are identical.' In a sense, therefore, this type of OD publishing involves tailoring a specific individual product from a total store, which may appear very different from the types of OD publishing we have so far considered, but can be brought within a general scheme as we shall see later. We are led from Fenaughty's suggestions to consider the existing Ceefax, Oracle and Prestel information systems.[23,24] Whether we can regard the transitory images on visual display units as publishing in our sense may be open to doubt, but one can certainly imagine the auxiliary provision of a hard-copy version of the information which would then come well within the scope of Fenaughty's vision.

Some forms of electronic journal[25,26] could provide single copies OD and the same sort of economic arguments can be invoked, coupled with rather complex ones comparing costs of conventional paper systems, for example, production and distribution, etc., with its electronic alternative.[27]

Should we also include on-line secondary information services as OD publishing? It seems to be stretching the definition rather far, but perhaps it is as well to remember the similarities with the systems we have just been discussing, for example, the tailoring (by searching) of a particular product from a large database and the limited market for the majority of items within the data base.

Reports, other 'grey literature' and theses

Reports, emanating from government bodies, national or local institutions, industry, etc., come in all shapes and sizes, have differing purposes and carry varying degrees of authority. Some may be best sellers; others have, at best, a circulation of a few copies. Some may even be virtually indistinguishable from conventional books.

Although there is a lot of report and other non-conventionally published literature (recently blessed with the term 'grey literature'), the very problems of bibliographic control which have recently been receiving European attention[28] mean also that there is no reliable estimate of the amount that exists.

There are some features, however, which we might expect to appear in a large proportion of the grey literature:

i there will often be a very limited market;
ii many reports will be very large;
iii the content of the report is likely to be considered of more significance than its form (compared to conventionally published work).

Such considerations lead naturally to the suggestion that OD publishing might be appropriate since, for *i* and *ii* above, costs of production are incurred only when there is a demand for the product and *iii* means that reprographic technology using camera-ready copy may be more readily accepted. Some institutions clearly can, and do, operate such systems for their own reports. One, for example, uses a word processor to produce several drafts of a committee report and then produces the final version OD.

Many reports and theses are currently produced OD—one can cite the activities of the National Technical Information Service (NTIS)[29] for reports and

University Microfilms (UMI) for theses. (UMI, in its publicity material, claims to cover virtually all North American dissertations since 1861.) For both these operations there appears to be the assumption of a limited market for any individual title, and the need for a good system of bibliographic control (catalogues, etc.). A centre such as NTIS might be seen as performing both traditional library and publishing functions. Indeed, superficially, OD could seem to remove the traditional distinction between the functions of library and publisher.

Is it, then, not just a short step to the publishing of scholarly *books* in an OD way? To a certain extent, the answer is yes, and clearly OD publishers currently operating such schemes (*e.g.*, University Microfilms and Carrolton Press) will be hoping it can be taken successfully.

However, there are some major differences between conventional scholarly publishing and the type of OD systems we have been describing—differences which are usually well appreciated by publishers, but not always by others involved in scholarly communication. These related differences are both economic and social.

A first hint of these differences comes if we return to the topic of the thesis just mentioned. Publishers are well used to offers from authors of theses which they would like to see published as books, and well used to giving advice on how, if at all, they might be suitably adapted.[30] We can assert from this alone that many authors regard publication as a book as superior (or at least additionally advantageous) to having their thesis available as it usually is, in an OD scheme.

We now develop this point in order to give perspective on what has been the most discussed application of OD—for the publication of new scholarly books, *i.e.*, books which report or review original research findings. The journal *Scholarly Publishing*, and micrographic journals, have provided a forum for the debate.[31–36] First we consider how books come to be published in the conventional system, look at the economic and social forces acting there, and then go on to consider the economic aspects more specifically.

At one extreme there are, no doubt, occasions when an author produces a complete manuscript and sends it to a publisher without warning, whereupon the publisher publishes it after preparing it for the printer. Indeed, one can imagine an extreme view which would suggest that any greater role than this for the publisher restricts, or at least interferes with, the free flow of information from producer to user. Certainly, some authors do resent the constraints which they feel publishers will put on them, and this is sometimes a motive for do-it-yourself publishing.[37]

At the other extreme, a publisher may design a multi-author work and directly commission each author to write a chapter. The norm is somewhere in between these extremes. Conventional publishing is not just a matter of accepting or rejecting proffered manuscripts from eager authors, nor is it just a question of information dissemination. Typically, a book project is decided on, and shaped, through the interaction of author(s) (and possibly editors) and publisher. Any party may make the initial contact. This might be followed by a longer meeting, to discuss in some detail the content, length, level and particularly the potential market for the book. The author will probably have some, or all, of the following considerations in mind:

> Does he/she really want to write the type of book the publisher appears to want?
> What is the reputation of the publisher (*e.g.*, is there prestige attached to having a book published by the publisher?)?
> Will the publisher do a good job of producing and marketing the book?
> How much time is there in which to write the book?
> What financial returns are there?
> How *sympathetic* will the treatment by the publisher be (*e.g.*, in including illustrations, accepting delays, suggestions for book or jacket design, etc.)?

The list of considerations could be extended almost indefinitely, depending on the individual needs and preferences of authors.

Previous experience with a publisher is particularly important here. How well the author gets on with the publisher's representative may itself be a crucial factor in determining a successful outcome. It is by no means unknown for such a representative (often called a commissioning or acquisitions editor) to take his authors with him if he moves to a job with a rival publisher. Such a commissioning editor may find him/herself representing an author's point of view to the publisher, and the publisher's point of view to the author.

The publisher will be considering, amongst other things:

> Does he/she wish to publish the type of book that the author is interested in writing (*e.g.*, is there a market?)?
> How does the book fit in with the other publications of the publisher?
> Is there proper capacity within the publishers to promote the book?
> What is the author's scholarly reputation?
> What is the previous experience, if any, with this author?
> Can the author deliver the work within a reasonable time?

If they can agree on a project, the publisher's representative may ask for a detailed outline of the contents of the work, a synopsis, or perhaps even a sample chapter or two. When they are received they may be sent out to one or more referees who will be asked for comments. Revisions may be called for at this stage. All being well, a proposal may then be submitted to the senior management of the company that the publisher undertake to publish the work. If approved, contracts would normally then be signed.

Although a considerable number of contracts will be signed which *never* lead to a book, the publisher will hope to receive the author's manuscript eventually, and it may once more be submitted to referees for comment. In the light of their reports and the publisher's own opinion, the author may be asked to make amendments to his typescript. Referees' comments will normally refer explicitly to content (*e.g.*, accuracy, style, up-to-dateness, level, etc.). The publisher is also concerned about these aspects, but will want also to be involved in seemingly more mundane matters, such as overall length (particularly if the book is much longer, or shorter, than originally planned), the number of diagrams, the amount of complex typesetting that will be required, etc.

When an agreed version is produced, the manuscript will be sub- or copy-edited in preparation for printing—sometimes, but now rarely, this will be carried out by the same publisher's representative who has been in contact with the author. At this stage, almost always, there arise further detailed points that have to be sorted out with the author—anything from minor points of grammar, inconsistencies in use of units, mistakes in graphs, etc., to major ambiguities of meaning.

After the process is completed, the author may look forward to seeing the book published, probably several months later.

Several other types of interaction between authors and publishers exist. For example, the publisher may have various series of books in particular subject fields, and call on the services of a series editor (usually an academic) to find and recommend suitable authors. Some of the varieties of author–publisher relationships in the UK are well explained by Mann in a recent report,[38] while another recent paper by Powell[39] gives a good insight into the internal operations of two American publishers.

The relative weights given by authors and publishers to the above points depend on a number of factors. For example, it seems clear that in some subjects there is no shortage of authors willing to write, and the publisher's problem is more one of selection. In others, there are relatively few authors available (*e.g.*, in some of the applied sciences, where the knowledgeable potential author may often be in industry and perhaps have little incentive or time to write), and the commissioning or acquisition editor may be planning the volume and searching for authors who will write a portion of the work. Again, some publishers are more established or more prestigious than others, and will attract authors on this account alone, and perhaps receive a greater number of unsolicited offers. However, the proportion of solicited to unsolicited material received is not easy for a publisher to estimate, since by the nature of the work, contacts and visits are always being made, which may only bear fruit at a much later date, or may give rise to an approach by a third party. For some not-for-profit publishers (*e.g.*, university presses), particularly the smaller ones, their operation may be much simpler, and may often be much more a case of *selecting* worthy titles which may need subsidy.

This long, but nevertheless incomplete, description is meant really to demonstrate the extent and nature of the interaction which may take place between author and publisher before a book is produced. We mentioned earlier how a micropublisher may be creative in selecting and building a list. As we have seen, this can be true in a more literal sense for the conventional publishing of original books. We should, perhaps, not overstate the case, since the author is obviously the primary creator, but we can, at least, see how a publisher will feel he has a positive role to play.

Why is there a need for interaction between author and publisher? Depending on the nature of the project and the publisher, the need can be defined in terms of *quality* and *market*. Even for not-for-profit publishers, the potential market for a work cannot be ignored, but the quality of the work, given the availability of money, will be of primary importance. Turnbull relates that at Edinburgh University Press his remit was 'the publication of commercially unremunerative research work',[40] and says that 'the academic importance of a book shall take priority over its commercial appeal'. For a commercial publisher (and for many not-for-profit ones) *quality* and the potential *market* are two major factors in the overall economics. The book has to be of the right quality, at the right level, for a particular market who will buy it at an economic (*i.e.*, profit-making) price.

A publisher has to make an investment decision on each book published, whether or not to commit several thousand pounds to the project which, if successful, will result in a profit some two to three years after the investment is made. To do this, steps must be taken to minimize the risk and maximize the potential profit. Thus, this economic barrier can be seen as a crude, but effective, source for quality control and creativity. The economic nature of the deal might be expressed by the author or the publisher thus: the publisher puts up the money to produce the book, in return for which the author provides his intellectual labour, in the hope of eventual mutual gain in prestige and money. The justice of the relative proportion of each gain received by the parties may well be a subject of some debate, but that does not alter the capitalist nature of the deal.

In crude terms, in publishing a book conventionally, a publisher is putting his money where his mouth is. This immediately gives some prestige to the published work, whether fully deserved or no. The author may feel that there is an achievement over and above the creation of the work. This is almost part of what publishing has come to mean (even though most authors do not consciously regard the deal as an economic one).

This section has been pertinent to our theme of OD publishing. To see it as an alternative to conventional publishing we must first examine what conventional publishing is. We argue that the economics behind the conventional system are partly responsible for the nature of the finished product. We are not just dealing with the dissemination of neutral information from producer to user—*the nature and status of the information are affected by the process.* Some of the naively proposed advantages of OD publishing take no account of these aspects. They stress the lack of risk in OD without consideration of what else may be lost.

So far we have stated what might be called the conservative position; this is open to challenges as we shall see. Nevertheless, if we can assume that a large percentage of potential authors and publishers accept this position, there may be considerable stumbling blocks for the widespread introduction of OD for scholarly books.

On what grounds may we attack this position? First we might assert that it is a traditional reactionary response to new, and possible revolutionary, developments, for example, we might use historical parallels—would not the monks and scribes of the fifteenth and sixteenth centuries have raised similar objections to the introduction of printing of multiple copies using moveable type?* They might have said then, as we might now, that if it was not worth spending the time, effort and money in producing it in the conventional way, it was not worth producing.

There is certainly some justice in an attack on the conservative position. There is little doubt that the conventional system, as it stands, is an imperfect system. There is no guarantee that all good scholarship that deserves to be published is published. Still less is there any fundamental law that states that the size of market currently necessary to make a book financially viable provides a perfect criterion for judging the needs, or best interests, of a scholarly community. Indeed, the recognition of this provides much of the *raison d'être* of many university presses.

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* I am grateful to Bernard Williams of the NRCd for this illustration.

Further, the height of the economic barrier we have described must to some extent be arbitrary since we can easily imagine a development (technological or otherwise) which could lower (or raise) it, thus allowing (or denying) the publication of hitherto uneconomic (or economic) works. Nevertheless, while not perfect, the economic barrier to publication may historically have proved of value.

It is, of course, possible that technological developments will make some of these arguments redundant. In addition to those already mentioned in connection with journals, we should also cite, particularly in relation to OD, development in computer-assisted make-up and laser printing, as described by Freedman.[41] However, currently, and in the near future, OD technology for *books* is no more sophisticated than the use of photocopiers and microform equipment. In some cases, OD is seen as an expedient or palliative—in others, as a step toward a fundamental development through technological change.

The system we described, where an author may have to make revisions and changes to satisfy referees and publishers, may also be seen as restrictive and arguments about it are reminiscent of the long-standing debates on refereeing for journal articles. Although there are similarities there is a basic difference within the conventional system. For an individual journal article, the potential market for that article is not a consideration, although readership may be (the market may well, of course, be a consideration for the journal as a whole).

To summarize, at one extreme we can suggest that the conventional system of publishing scholarly monographs proceeds by strong interaction between author and publisher; that the need for this interaction has its source in the publisher's need to minimize financial risk, and/or to assure a profit, and that the act of publication bestows prestige on the author not only for the work itself, but because the work has been deemed worthy of financial investment and/or subsidy. At the other extreme, the economic barriers may appear to raise unnecessary obstacles to the free dissemination of information, and lead to interference with the work of authors.

Neither of these extremes is accurate. The former explains why there will be resistance (on the part of authors as much as some publishers) to on-demand systems, and suggests that OD publication does have some dangers. On the other hand, there is a case for examining alternatives to the conventional system. We now compare the costs in conventional and OD publishing to see what changes have to be made in order to make substantial savings.

Economic aspects

Bailey[42] has examined the relative costs of conventional and OD using photocopiers, and some of the economic implications of other changes normally assumed by OD proponents, but not often made explicit. Nash[43], in a study which deserves wider recognition, gives an extensive analysis of the costs of conventional publishing for eleven UK academic publishers, and compares microfiche production with these conventional costs.

Let us first consider conventional book publishing. Each book is different, and rarely will two books, even of the same length, have the same costs. However, the major components of costs are production costs—typesetting (or filmsetting); machining (printing); materials (paper, ink, etc.); binding—and other costs—copy editing, editorial costs (acquisition editor, selection and refereeing), storage costs, marketing and distribution, overheads (accounting departments, senior management, buildings, etc.).

In the conventional system, the other costs listed here can be very large—over 50 per cent of the total cost in some cases. (We should note that many of these other costs are often calculated as totals for the whole publishing operation and then allocated to each project on a somewhat arbitrary basis.)

Let us now take the major cost items in turn, and compare conventional with the OD alternative:

Typesetting

Typesetting costs (for a given complexity of setting) are almost entirely dependent on the length of the book, and do not depend at all on number of copies printed. (Typical costs would be equivalent to several pounds per page.) Thus, there would be no difference between conventional and OD systems. However, OD normally assumes that typesetting is dispensed with, thus making a considerable saving. But such an option (using offset litho, for instance) is also open to conventional publishing and many publishers do produce books from author-prepared or in-house prepared camera-ready copy (unions permitting). As technology improves (*e.g.*, as widespread introduction of word processors occurs) we may eventually see the distinction between typesetting and author-prepared copy disappear, but that development is still some way off—at present, most OD systems have no exclusive advantage in typesetting, or origination.

Machining and materials

Here we are referring to the primary manufacturing process. In conventional publishing these are the costs incurred when the presses are running—in OD, typically either when the photocopier or microfiche copier is working. The comparison of costs here is crucial, yet it is by far the most difficult. Consider Bailey's figures for offset printing costs in 1974.[44] He compares these costs for 0 to 1,000 copies (of a 320-page book) with Xerox copying at three costs (1 cent, 2 cents and 3 cents per page). This indicates that above 350 copies offset is cheaper than photocopy at even 1 cent per page, above 150 copies at 2 cents/page, and above eighty copies for 3 cents/page.

The first point to make is that the above costs are all hindsight costs, *i.e.*, they only represent valid comparisons after copies are sold. Proponents of OD would say that one of the main advantages is that it tries to cater for the uncertainties in estimating how many will be sold, *i.e.*, the publisher does not need to guess prior to publishing. This does, of course, beg the question of how one prices the product, to which we shall return.

In practice, it is even more difficult to compare costs, since several factors other than the technological process itself have to be taken into account. No printers, as far as I know, offer a photocopy service. Thus a publisher will have to consider the costs of sending a work to a bureau, or doing it itself. The ubiquitous photocopier allows this option for many institutions (thus there is often some overlap between the idea of OD and do-it-yourself publishing). These costs can vary greatly. For example, a university or company may have its own reprographic unit which may or may not have spare capacity. Photocopiers may be rented or bought. On rented copiers there are often differential rates of charges for different numbers of copies—differential rates which do not necessarily reflect the true changes in cost. Photocopiers now sell at prices from below £1,000 to over £45,000, and so anyone thinking of attempting to publish a large number of titles by OD methods has to weigh the (dis)advantages of buying (*e.g.*, the tying up of capital in investment on photocopiers) *versus* renting.

For such reasons, it is very difficult to give the sort of comparisons given by Bailey which will correspond to any particular institution's or publisher's circumstances. However, we can say that currently the marginal cost (*i.e.*, the cost of producing one extra copy) in conventional machining is lower than that in photocopying so that at high print-runs (say over 1–2,000) conventional machining will be cheaper. When computer technology reaches the stage that satisfactory output in hard-copy or microform (COM) is produced at a lower marginal cost than conventional system OD may begin to become the norm for many types of printing, including those suggested by Fenaughty.[45]

That the output should be satisfactory is, of course, important, since currently photocopiers and computers have some difficulty in handling half-tones and some other graphic material, as well as colour illustrations (microform is quite able to handle them), although colour photocopiers are now available. University Microfilms in their OD programme use litho for some graphics, and merge these with photocopied text pages.

Costs for microfiche systems are perhaps even more complicated. Thomas[46] has recently quoted costs of as little as 3p. for a duplicate diazo fiche with ninety-eight frames, but for proper comparison we have also to consider the cost of producing the original microfiche, and the costs in making provision for reading the duplicates (readers/reader printers). Nash compares actual costs of academic books and microfiche, and finds that halide copies are cheaper up to quite high runs, and diazo copies are *always* cheaper.[47]

Binding

Basically the same systems are open to conventional and OD systems except that separate sheets are produced by photocopiers, and so OD are more likely to be perfect bound, a cheaper and less durable method than conventional stitched bindings. (This, of course, does not apply to microform.)

Copy-editing

Since in OD there will typically be no formal typesetting process we can also assume that, for the most part, copy-editing (*i.e.*, preparation, marking up of the text for the printer) will also be dispensed with.

Editorial marketing and overheads

As we have discussed at length, editorial procedures do not, strictly, have to change and thus costs could be similar. However, the OD literature often refers to minimizing risk and that little will be lost if some titles fail to sell, which rather suggests that selection procedures will change, and so will costs—for example, some costs may be spread over a large number of titles. Similar arguments apply to marketing and overhead costs.

Distribution

For hard-copy OD, conventional systems have much the same costs. However, since in a strictly OD system production does not take place until receipt of order, one would expect delivery times to lengthen.

Microfiche output would, of course, be substantially cheaper to distribute, even though it is sometimes penalized by different tax and postal rates.

Storage costs

Storage costs are virtually eliminated for OD publishing. Bailey[48] mentioned that storage costs are typically 7 per cent (warehousing and interest on inventory) in university press publishings in the USA. Nash[49] found an average percentage of 10 per cent. In OD almost no stock is created.

However, we must again consider just what is involved in OD publishing. If OD is undertaken in-house, on a large scale, then there will be the additional costs of buying and storing large quantities of paper (some conventional publishers also buy their own paper) as well as providing space for the production facilities. And, if established, there will, in some cases, still be small stocks of each title.

The other important cost comparison concerns the investment needed for each new title. Where the facilities for OD exist, when each new title requires very little capital to put it into production, money is only invested in producing each copy, and that only when there is a prospect of immediate return. In conventional publishing several thousand pounds will be invested in each new title before it begins to sell, and return is spread over perhaps three or four years or more. Thus, OD should not have the cash flow problems associated with conventional publishing—always assuming, that is, that the money is there to support the other publishing activities (*e.g.*, production equipment, marketing and distribution). It can, therefore, be seen as a useful expedient for institutions having these facilities, but little capital resources.

Promotion and marketing of titles is a major consideration. For a conventional publisher, promotion will include the sending of leaflets to institutions and individuals, of review copies to relevant journals and perhaps even space advertising in some journals. These options are open to OD publishers, but the similarities to library operation in production which we have outlined may suggest a similar move in promotion techniques. Again, this would be because there may be a trend towards a large number of titles not lending themselves to individual treatment. Such a trend would mean more emphasis on catalogues, abstracts and current awareness services, the stock in trade of library and information services. This, of course, is not comparable to conventional promotion. The latter is intended to persuade a potential buyer to buy; the former is concerned only to inform of the availability of various works. At the extremes, this would be like comparing television advertising to classified advertising in newspapers. While some would no doubt welcome such a change, we have again to consider the reactions of a prospective author. How much does the author want to see his/her work *vigorously* promoted?

Review copies (*i.e.*, copies of a book sent free to various journals in the hope that a book review will appear in the journal) present a particular economic problem for OD. In conventional publishing, typically, thirty to fifty review copies may be sent out. Where the expected market is quite large, say, 3,000, these copies (which are kept by the reviewer) may represent only 1–2 per cent of the expected sales. However, for an OD book, with possibly a total market of 200, this number of review copies may represent 15 per cent or more of the market. There may thus be a temptation to restrict the supply of review copies. In addition, of course, it is unlikely that review copies themselves would be produced OD; a short-run would be needed. Lastly, since no title ever goes out of print, in theory promotion of a title could go on indefinitely. In practice, there would inevitably be, as a work grew older, more reliance on inclusion of its bibliographic details in catalogues and indexes.

Pricing OD publishing

How should one set the price of an OD work? From the conventional publishing viewpoint it certainly presents a problem. In the conventional system a publisher has to consider:

i What are the prices of other already available works of this type and level?
ii What are the total sales likely to be at these prices, or others?
iii Is there a size of print-run which enables the publisher to sell at such prices to such a size of market, and yet to make a good profit?

(Similar considerations apply to not-for-profit or subsidized publications, but *iii* may become a question of making an *acceptable* loss.) If there is not satisfactory answer to *iii* the publisher will not normally publish.

Publishers vary in their methods and, of course, can never be sure of future sales of a work at any particular price. Typically, publishers will price using a rule of thumb method—calculate the total production costs (printing, paper, binding, etc.) for various (perhaps two) sizes of print-run; from this establish a unit production cost for the work; multiply this by a somewhat arbitrary number (typically between five and six) to get a selling price. (See, however, Turnbull's strictures against such practice.[50]) This mark-up is not entirely arbitrary since the selling price has to take into account a number of known factors, for example, discount to booksellers or overseas agents (perhaps 30–35 per cent), author royalties (about 10 per cent) and by definition, production costs (20 per cent). The remaining 35–40 per cent has to cover overheads and profit.

For an OD publication some such mark-up method could be attempted after estimating total costs for producing copies based on estimated total sales. But OD has been praised as a method which removes this very uncertainty of estimating number of sales. The publisher still has the option *1* above, *i.e.*, basing price on similar works published elsewhere. But, as we have noted, OD normally means dispensing with conventional typesetting and may involve other cheaper methods, so it is difficult to compare with conventionally produced works. And, whatever price is chosen, it has, as before, to cover overheads and may have to allow for discounts and royalties.

The truth is, of course, that *there is no way to avoid estimating the sales*. Without it, there is no way to try and balance income against expenditure. What can be attempted in OD is to spread this estimate across a number of titles which are to be published OD. This then moderates the difficulties in estimating each individual title's potential, means that good sellers support the poor sellers, all of which is implicit in the claims of minimizing risk made for OD publishing. One now has to estimate the overall rate of demand for works and then how much equipment, personnel, etc., will be needed to respond to this demand. Costing and pricing can then be done on the basis of time taken to reproduce the individual work (which may be proportional to the work's length) or an average cost for works of various lengths. This, of course, does not remove the uncertainty of level of demand.

It would seem best to obtain as many OD titles as possible, and adjust production gradually, building it up in response to demand. In its early days at least, such a system would probably need to be subsidized, or operate as one aspect of other operations, or at least have its overheads carried by them. The big question is whether either number of titles or level of demand or their combination would be sufficient. If it could, we could then foresee a system which had an ever-increasing number of titles in its list (since no title would go out of print), and successful operation would depend on overall level of demand (given that prices were calculated to make a profit), not on individual titles.

As the number of titles increases the system begins to take on some of the characteristics of *library* operation, *i.e.*, a store of works, some little-used, available through consultation of catalogues, and other bibliographic tools, but where library lending or reading in the library is replaced by a purchase. Some of the similarities between OD and library practice have been pointed out by several writers (*e.g.*, Smith[51], Fruge[52,53] and Alter[54]). Alter has even pushed the idea further with his mention of the duplicating library.

Indeed, if we remove some of the external publishing operations such as marketing, we are back to *depository* publication where a library may offer copies of little-used material either on loan or for sale—a service which almost certainly would have to be subsidized.

We should try to put these developments in a wider perspective. We can view a change from conventional publishing with its concentration on the merits and sales of individual titles, to on-demand publishing, which in a developed system concentrates on overall demand from a large number of titles with a limited demand for each as an *inversion* of the publishing process ('flip-flop arithmetic' as Alter calls it). It relies on the selection by the user or reader from a store of information. Not only is this similar to library operation, it is the basis of modern *information retrieval systems* where these stores are typically abstracts of articles in conventionally published journals. It is also the basis of retrieval systems for OD publishing of reference works or magazines as discussed by Fenaughty[55]. Note that traditional hard-copy abstract services do not operate in an OD way, since they rely on providing the whole store of information for reading—their economics are the economics of the large-scale printed reference work, like directories, etc. The same is true for those who purchase the magnetic tapes for secondary services.

However, when we move to on-line searching of remote databases we find that, similar to the OD system, the overall level of demand needs to be sufficient to support the acquisition and storage of large amounts of little-used data. (In fact, the economics of most current on-line services are not independent of the associated hard-copy abstracts journals, at least as far as the database producers are concerned. However, the economics of host services (the intermediaries who put several databases up on a computer) are as described.) It is in this sense that OD and information systems become inverted publishing, as shown schematically in Fig. 1.

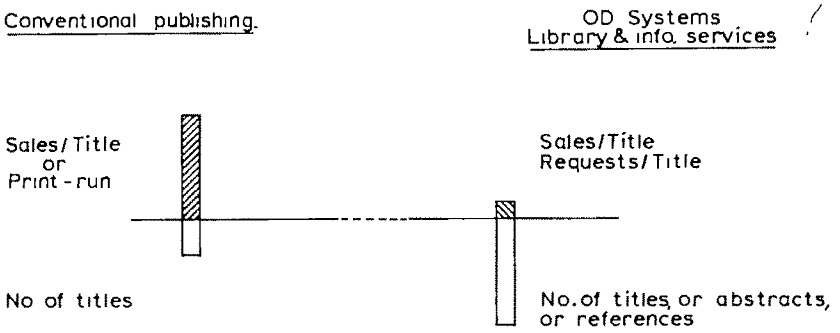

FIG. 1: *Inverted publishing*

Finally, we return to those aspects we have stressed most: publishing as a creative process and as a method of quality control. In the searching of databases of secondary services this is not a problem for OD as such, since, at present, they *are* secondary services—whatever creative or quality control problems exist are merely taken over from the primary sources. For scholarly books, monographs, etc., we have suggested that the traditional economic barriers can provide both creative and quality control mechanisms. It can be argued that in OD systems the economic barrier remains, primarily because of the overhead costs of running such a system. This can be granted, but it is clear that for each title the barrier is now lowered, not only because there is now no large initial capital investment in producing the work, but also because in a developed system these overheads are spread over a large number of titles. Put crudely, an OD system will serve as well for a poor book which sells only 250 copies (out of a potential of 4,000, say, had it been a good book) as for a good book which sells only 250 (out of a potential of only 300 copies, say, had all the market been reached) and is thus in danger of not being able to discriminate between the two.

It would seem that some of the creative aspects of publishing will be lost in OD systems. The type of creativity remaining may be that of the current micro-publishers, *i.e.*, building lists of titles in particular fields to shape an overall programme, rather than involvement in the planning of individual works. One way to try to maintain the creativity would be to remove the responsibility for selection of works from the OD publisher and leave it to another body concerned primarily with good scholarship. The OD publisher then offers a service to that body. In a sense, the 'Imprint' series scheme of University Microfilms operates that way in that they undertake to publish OD for other bodies, for example, university presses.[56] In this way OD might well assist the traditional operations of such presses. This can then also act as a partial control on quality. Other quality control procedures which can be used include the traditional one of refereeing, but also the idea of having a work sponsored by the host institution of the author. The University Microfilm 'Sponsor Series' operates in this way—one should note that this system involves a fee, payable by the client publisher or author of around $300–$500. University Microfilms have quite a developed OD programme. They produce *Monograph Abstracts* which lists titles available, and produce OD books in a variety of formats, both cloth and paper bound. Xerography is the main method of reproduction, but off-set lithography may be used for large orders.

Conclusion

This may have seemed a somewhat pessimistic appraisal of OD publishing, at least for the publishing of original scholarly monographs. In some ways this is so. We have been at pains to point out the interaction of social and economic forces in the conventional system, and how far that system departs from a naïve conception of the dissemination of information from producer to user. Such a system may be viewed as restrictive or creative (or both), but it cannot be ignored. While conventional publishing remains a profitable business it will be difficult, if not impossible, to operate in parallel a large-scale OD system for monographs, unless it can be made to offer similar social rewards to authors.

For OD publishing of monographs the economic barrier of conventional publishing may be considerably lowered, but not removed. We suggest that for a developed system, the overhead costs in OD will be spread across a much larger number of titles than in conventional publishing. This not only further lowers this barrier, but also shows the system to have similarities with *library* operation and other more conventional OD systems in information retrieval. It is, however, conceivable that in the long term technological advance will render a distinction between OD and conventional publishing untenable.

Our assessment is by no means entirely negative. There are several areas where for scholarly books it is appropriate and useful. As we have stressed, there is no fundamental law which ensures that everything which should be published *is* published (even though some academics or publishers seem to adopt this position). To assert such a thing implies a belief that the size of the current economic barrier *fundamentally* corresponds to the desirability of publication, when this can clearly be shown not to be so. Where there are works deemed of scholarly merit, but not economically viable, OD should have a role to play. We have gone through the various publishing procedures to indicate that OD normally implies more than a cheap manufacturing process. How far a publisher is willing to change other parts of his procedures will determine the character of OD, particularly in terms of quality control and marketing.

To be accepted, in its initial stages at least, OD would seem to need vigorous marketing, comparable in scale (and therefore cost) to conventional methods. It would seem best suited to those organizations which can absorb or cover the initial overhead costs in other operations. While large libraries are likely to be able to do the latter, they also are particularly unsuited to undertake extensive marketing. On the other hand, large micropublishers or government agencies may have the stigma (in the eyes of authors) of being depository publishers of PhD theses or technical reports (where, in the latter case, pricing policies have apparently been difficult to establish).

Candidates for successful OD publishers would seem to be (not in order of merit):

large libraries who may be able to absorb some overhead costs and/or benefit from economies of scale and who are prepared to:

> learn and adapt conventional promotional techniques; take other steps to overcome the prestige problems we have stressed (*e.g.*, setting up of a strong editorial board);

large micropublishers who may already have OD production facilities and similar economies of scale and who are prepared to:

> stress hard-copy availability, overcome prestige problems, for example, take steps to remove the image of depository publishers of PhD theses, old manuscripts—perhaps to the extent of having a different company name, adopt active title-by-title marketing;

conventional publishers who might opt for OD as a manufacturing technique:

> with no other changes in procedures, thus incurring no prestige problems with authors, other than those associated with production from camera-ready copy. Since many publishers do already use camera-ready copy this may well be a development which could occur as technology improves—*i.e.*, a move to in-house production by publishers.[57] One can only speculate what effect union attitudes might have on such proposals.

As reprographic technology improves it may well become tempting for research and learned institutions increasingly to adopt do-it-yourself OD publishing, using their own reprographic departments. Prestigious institutions might well do this with success, but should not, of course, underestimate the direct and overhead costs of running such systems, nor of engaging in marketing activities. Perhaps co-operative arrangements between institutions could better exploit the economics of scale. Frugé's suggestions for university presses are along these lines.[58,59]

However, the basic assumptions of the Reverend Hume have yet to be verified or quantified—are there lots of worthy manuscripts written or waiting to be written, which are denied publication solely on economic grounds? We hope that some of our further research in the UK will provide at least a partial answer to this question.

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Letter to the Editor

BRADFORD'S LAW

Drott, Mancall and Griffith[1] are to be congratulated on a remarkably lucid exposition of Bradford's Law and its applications to information searches. They rightly stress that it is a mathematical and probabilistic law. This means that it describes the pattern which emerges from enough data of a particular type, but that it says very little about the performance of any individual item. In the same way, the consistent pattern found in data for human growth is a very uncertain guide to the weight of any individual child. It is important also to appreciate that in Bradford analyses of the individual items of data studied are defined as the ranking orders of journals (*i.e.*, journals cited or used the same number of times are equivalent) and not individual journal titles as such. The important question of whether journals of the same rank are or are not always the same titles is excluded from consideration.

Their full discussion of applications of the law does not examine in detail the suggestion made in their introduction that the Bradford approach can be used 'to identify important journal titles or to select items for weeding'. Had they examined the implications closely that suggestion would probably have been omitted altogether because it assumes first that the probabilistic pattern can be used to predict individual performance accurately and secondly that that performance is consistent between one search or survey and another. Bradford's law says nothing about either of these assumptions. Little thought is needed to realize that there is a wide variability between the topics covered in the contents lists of different issues of any journal or in the interests of individual searchers on different occasions. These sources of variation must influence the relative ranking orders of individual journals in different searches but are totally excluded from a Bradford analysis of rank numbers.

Little work has been done on the extent of the variability in the relative positions of individual journals between one ranked list and another. In 1971 I found[2] the correlation between two ranked lists a year apart to be as low as 0.18. More recent work[3] on current awareness uses of chemical journals at the Science Reference Library suggests that a difference of as many as ten uses between one title and another may not be statistically significant. The ranking order in a single Bradford type analysis is, therefore, of negligible use in the critical decisions between one little-used title and another. A librarian's professional judgment, which can take into account a knowledge of the subject and of the readers, will be far more reliable.

A. SANDISON
London

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MICROPROCESSORS

The letter from Mr M. J. Rowat (*Aslib Proceedings*, 31 (8), August 1979) makes several valuable points about the need for caution in considering the use of microcomputer-based systems in libraries. Without wishing in any way to temper the enthusiasm of Dr P. W. Williams' original article—which I enjoyed—I would like to indicate some more areas of difficulty in library automation which are not solved, or are made worse, in a microprocessor context.

Librarians do not find the language or the working practices of computer specialists easy to understand; more seriously, the reverse is also true, since for the outsider, library and information work is complex, involves a great deal of detailed know-how, and is sometimes just downright obscure. (After ten years of trying to make computers do what librarians want, I still occasionally cause raised eyebrows by making 'un-librarian-like' statements.) This makes the design stage of projects particularly difficult, and raises the need for very careful checking that both parties to a design really are talking about the same thing.

Many library automation projects are undertaken on rather fine financial justification, for the benefits in effectiveness which are expected to ensue, but which are difficult to cost. This can lead to under-provision for proper design studies, for thorough staff consultation and later training, and for development contingencies. The normal result is lateness in delivery of a working system.

Because the programming process is fairly tedious, and even well-written programs are not easy to change, it is often found that a computer-based system tends to be relatively inflexible unless a long view of the user's potential development has been taken at the original design stage.

In a system of any size, it is the storage hardware which will, for some time, be the main cost element. Microprocessors will reduce the cost of the logic units—but this tends to be fairly minor already with a minicomputer. I am inclined to believe that the most valuable gains in the short run will come from intelligent terminals (to remove low-level processing from the centre to the periphery), and in improved reliability.

I am still convinced, as I was in 1975 (Co-operation in Library Automation: LASER, 1975. OSTI Report no. 5225), that major gains are to be made, both in cost control and in technical effectiveness, through the use of co-operative development groups, and the re-use, wherever possible, of existing know-how and software.

J. H. ASHFORD
J. H. Ashford Associates
Maidenhead, Berks.

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